Safety Maintenance

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(For details, use Key # M-1 on Inquiry Card on page 1)

BULLETINS & CATALOGS

As a convenience to executives, these new publications of manufacturers are offered by the Reader Service Department of SAFETY MAINTENANCE. To obtain copies write in the key numbers on the free-postage card below.

INDUSTRIAL HYGIENE

Bibliography 218
Sindar Corp. has just published an annotated bibliography on Hexachlorophene, an antiseptic ingredient for soaps. Included are abstracts from 23 articles and four patents.

First Aid Stretchers 219
Reeves Sales Co. Illustrated folder describes an improved flexible stretcher that can be used in narrow spaces and features a zippered division into two parts that permits slipping the stretcher out from under the patient. Also describes other stretchers and stretcher-canisters.

Exhaust Hoods for Foundries 220
American Air Filter Co. A new 28-page manual illustrates exhaust hood designs for various operations in foundries, such as shakeouts, melting furnaces, sawing, grinding, abrasive cleaning and tumbling, sand handling, etc. Includes data on a typical dust control system and the operation of dust equipment.

PERSONAL PROTECTION

Safety Glasses 221
American Optical Co. A complete, new catalog covers a new line of safety glasses featuring several styles with plastic and metal frames to fit and protect all employees. Includes photos and diagrams of construction details, and information on the use of side shields and filter lenses.

How to Select a Gas Mask 222
Acme Protection Equipment Co. Unusually helpful data is contained in this bulletin which offers guidance in selecting gas masks. It covers face-fitting problems, leakage, valves, hose connection, microphone attachments, vision, head harnesses, maintenance, and materials used.

Safety Hats and Caps 223
Flood Safety Products Co. Bulletin describes and illustrates a new line of hats and caps available in fibre-glass, aluminum, or plastic-electrical shells. It features a plastic-zippered polyethylene suspension that tightens to the hat shell on impact.

Rainwear and Protective Clothing 224
Mine Safety Appliances Co. Liquid-resistant clothing for industrial, utility and special applications is described in this 12-page brochure. Includes suits, coats, pants, aprons, hats, etc., made from heavy or medium weight neoprene latex. Gives data on applications, resistance characteristics, sizes and instructions for care and cleaning.

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FOR MORE DATA

FIRE PROTECTION

Watchman's Report Form 225
Detex Watchclock Corp. Sample sheets of a new watchman's report form are available. The forms remind the watchman of all dangers he must check and serve as a permanent record of conditions needing follow-up.

Fire Hydrants 226
A. P. Smith Mfg. Co. This 20-page manual covers the operation, construction and maintenance of a new model fire hydrant. With detailed cutaways and drawings, it describes construction features, installation, inspection, maintenance and repair. Included are details for optional constructions and ordering information.

Spontaneous Combustion 227
Pyrotronics. This reprint of an article from an English magazine describes the process of spontaneous combustion and also gives details of a method for the early detection of combustion.

Fire-Resistant Acoustical Tile ... 228
Armstrong Cork Co. This 12-page color booklet outlines the uses of an acoustical ceiling tile for non-residential construction where rated fire protection is required. It shows how the tile gives protection for the floor under which it is installed, helps check the spread of flame, and is less costly than other fire-resisting methods.

PLANT MAINTENANCE

Floor Maintenance 229
Advance Floor Machine Co. Instructive illustrated booklet gives step-by-step guidance in the cleaning and maintaining of all types of hard and resilient floors. It shows how to select equipment, cleaners, and waxes; offers tips on common floor problems; and provides data for work schedules and job-time requirements.

Hydraulic Jet Cleaners 230
Sellers Injector Corp. Illustrated bulletin presents round-up of plant and tank cleaning equipment: six models for heavy-duty cleaning of floors, walls, and process equipment; three models for interiors of tank cars and trucks, ships' tanks, etc.; and also steam boiler injectors and shut-off valves for corrosive liquids.

Iron Aggregate Concrete Floors. 231
Master Builders Co. How concrete floors utilizing iron aggregate last longer is explained in this illustrated 24-page bulletin. Discussed are the features sought in industrial floors: wear and corrosion resistance, economy, spark resistance, static-dissemination, color, slip-resistance, and maintenance. Includes information on installation and application of floors.

(Continued on the next page)

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DECEMBER, 1959 **Please send me the following free data**

Free Bulletins (Cont'd)

Moisture & Corrosion Inhibitor .. 232
Corrosion Reaction Consultants, Inc. This bulletin describes a coating that seals metal surfaces against moisture and corrosion, and also lubricates. Emphasized is the product's application in electrical and electronic equipment to protect the devices and to restore equipment after flooding or corrosion.

Slip-Proof Coating 233
Walter Maguire Co., Inc. A slip-proof surfacing material utilizing emery aggregate and epoxy resin is described in a new bulletin, which shows applications in factories, highways, bridges, air terminals, and ships, and outlines the methods of mixing and applying the product on asphalt, concrete, wood, steel, tile, stone, or brick.

MISCELLANEOUS

Emergency Flashing Lights 234
R. D. Fageol Co. Illustrated bulletin describes a new model transistorized safety light for use on barricades and as a warning light for emergencies. It features electrical and mechanical details, cut-away views, and highlights its tamper-proof fastener, economical service life, etc.

Generator Sets 235
D. W. Onan & Sons, Inc. This catalog describes a line of high-capacity electric generating plants, covering more than 45 gasoline and Diesel engine-driven sets and including models for emergency or stand-by use in industrial plants, hospitals, etc.

Precision Measuring Tools and Instruments 236
Scherr-Tumico. This 96-page catalog contains complete information on measuring tools and toolroom specialties such as micrometers, gages, protractors, dial indicators, tachometers, dynamometers, illuminated magnifiers, microscopes, etc.

Manual Press Controls 237
MICRO SWITCH. This new 16-page catalog shows how trip controls can be applied to manually operated stamping machines, air presses, riveters, press brakes, shears, welders, paper cutters, etc., to make them safer and more productive. Descriptions and photographs present 15 different installations to safeguard operators and die-setters.

What's YOUR Problem?

- **Has an accident or fire interrupted production?**
- **Want to know how to prevent it?**
- **Do you need background information on equipment for industrial safety, hygiene, or maintenance?**

As a service to its readers, "Safety Maintenance" will arrange to supply manufacturers literature on the following subjects. Just insert the key number on the Readers Inquiry Card on the preceding page and be sure to fill in your name and address. If you need information on a specific type of product, simply write it in on the Inquiry Card.

Key Number	Subject
	PERSONAL PROTECTION
101	Safety Goggles
102	Face Shields
103	Lens Cleaning & Anti-Fogging Equipment
104	Sweat Band
105	Hard Hats
106	Respirators & Masks
107	Protective Clothing
108	Women's Protective Clothing
109	Safety Belts
110	Safety Gloves
112	Anti-Slip Soles
113	Oil-Resistant Soles
114	Welding Helmets
117	Safety Shoes
118	Safety Boots
	FIRST AID AND HYGIENE
121	Skin Cleansers
122	Sanitary Drinking Facilities
123	Wash-up Facilities
124	Salt Tablets
125	Resuscitator Tubes
126	Antiseptic Medication
127	Burn Medication
128	First Aid Kits & Supplies
129	Stretchers & Litters
130	Throat Medication
131	Eye Wash Fountains
134	Hearing Testers
135	Hearing Protectors
136	Noise Analysis Equipment
	FIRE PROTECTION
140	Fire Extinguishers
142	Fire Alarms
143	Safer Solvents
144	Degreasing Machines
145	Drum Safety Valve

Key Number	Subject
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148	Watchmen's Control Systems
	LIGHTING AND WARNING DEVICES
150	Alarms & Warning Lights
153	Fluorescent Lamp Guards
154	Emergency Lights
155	Powered Megaphones
	MAINTENANCE
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162	Floor Cleaning Compounds
163	Floor Cleaning Machines
164	Floor Resurfacing Materials
165	Paints
	LADDERS & HANDLING
170	Ladders
171	Ladder Safety Devices
172	Scaffolds
173	Work Platforms
177	Carboy Pumps
	GUARDS
178	Machine Guards
179	Power Press Feeders
180	Safety Tools
181	Vacuum Sheet Lifters
182	Valve Operators
184	Safety Lock-Outs
	EDUCATIONAL AIDS
191	Safety Signs
193	Employee Safety Guide
195	Changeable Letter Signs

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Safety Maintenance

formerly "SAFETY ENGINEERING"

Volume 118, Number 6 **December, 1959**

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Cover picture of a plant of Boeing Airplane Co.—by Philip Gendreau.

AMERICA'S PIONEER MAGAZINE IN ITS FIELD

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it's SAFE to say

● WHEN IS AN ACCIDENT REPORT?

Too often the terms "safety" and "accident prevention" are used incorrectly to express the same thought. Safety is the goal—the objective—and represents a relative freedom from accidents. Accident prevention consists of finding and correcting existing or potential hazards which result in accidental injury to men, material and property.

The ability to recognize those hazards comes from a knowledge of the types which have caused accidents in the past; plus the ability to forecast the possibility of future injury based upon a study of new processes and substances. Consequently, the more we know about past and potential accident causes, the more able we are to recognize apparent and unseen hazards. Then we can equip ourselves to take preventive measures.

There are several ways to learn about dangers responsible for losses, most of which are preventable to a great degree. We can always learn the hard way—suffering an accident to ourselves or seeing an accident happen to another individual. A less drastic but sufficiently lasting impact comes from reading and studying details surrounding an accident, provided those reports are sufficiently informative and detailed to help prevent a recurrence.

Since the most important step in accident causative investigation is the accident prevention report, it should lack no vital information. What happened; where and when; who or what was injured; what equipment, material and persons were involved; what was being done at the time of the accident; why did it happen; what was the extent of the injury (actual or potential); what could and should have been done to prevent it?

It serves no purpose to confine the accident report, for example, to "man slipped and broke his left wrist." What was the condition of the walkway surface; the lighting; his shoes; his carrying load; his physical state; his concentration? Other pertinent questions will suggest themselves to provide the best possible solution to problems of slips and falls.

If an employee got something in his eye, it is not enough to report, "particle in eye" or he was "not wearing safety goggles at the time." The basic reason must be identified and corrected if similar accidents are to be prevented. It may not be easy to learn *why* the man was not wearing goggles, but to make the investigation really helpful, we must make a vigorous effort to find that basic reason.

Incidentally, "carelessness" is no true cause of any accident. Few, if any employees are without care whether or not they suffer an injury—thoughtless, inattentive, given to taking unnecessary chances—yes, but "without care"—no!

Was the eye accident traceable to lack of education, orientation or supervision; mandatory eye safety rules; failure to provide the right goggles for the job? If so, the accident report should whitewash no one nor should it pass the buck to the victim.

Accident records, properly prepared to show the hazards and full corrective measures are not difficult to compile and interpret. Definitions and simple rules are published by American Standards Association in a pamphlet titled "The American Standard Method of Compiling Industrial Accident Causes" available from the offices of American Standards Association, 70 E. 45th St., New York 17, N. Y. This Standard names and defines the vital data required for accident prevention purposes. It gives rules to help identify essential items and tells how to classify the information into groups so that we can prepare, and digest, all the facts in a single, brief report.

Information gleaned from accident investigations will prevent no future injury unless put to use. This can be done at plant accident prevention meetings—perhaps a more accurate name than safety meeting. Certainly it has more "punch"!

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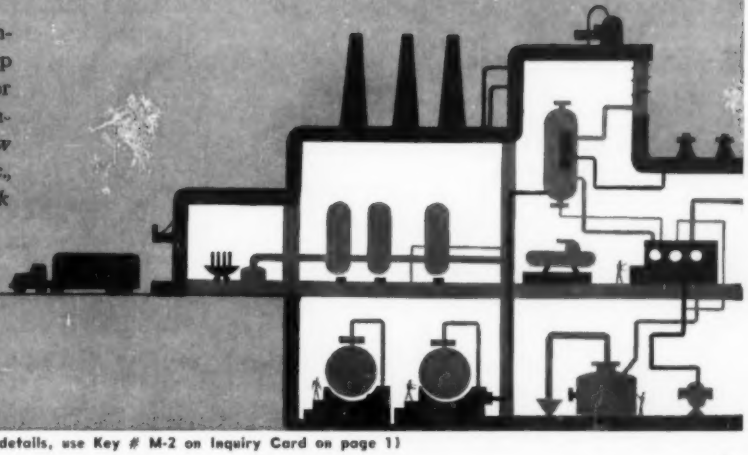

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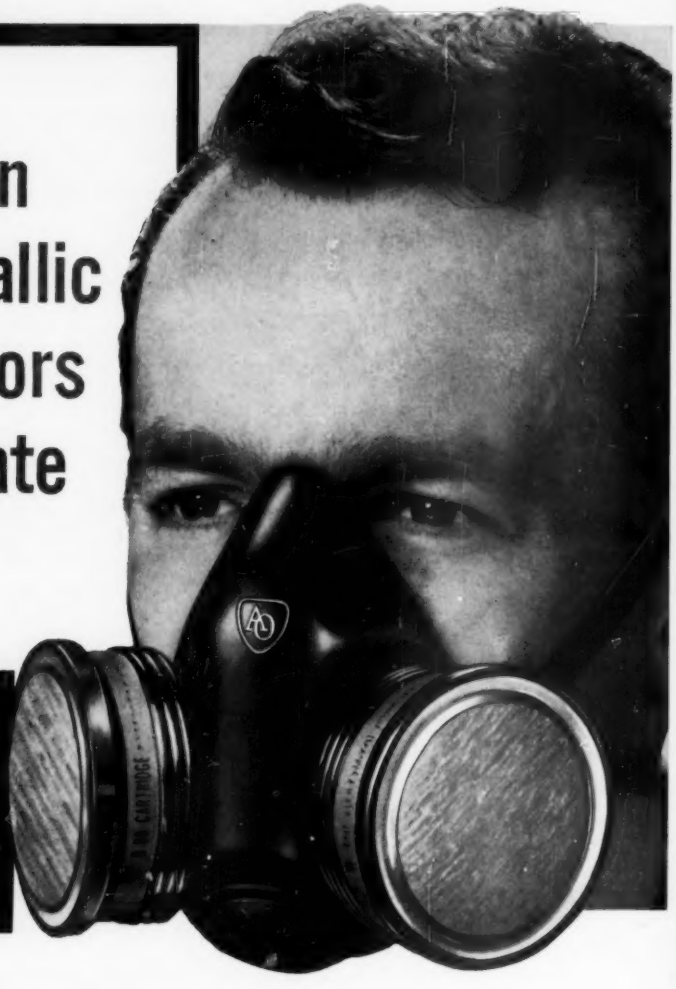

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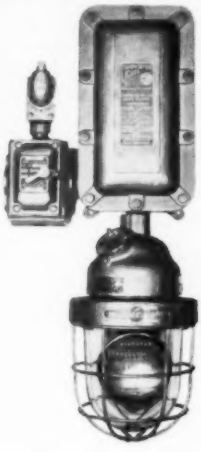

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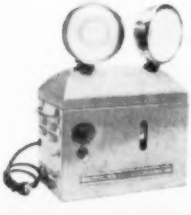

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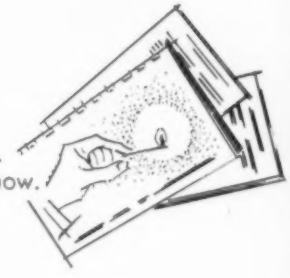

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THE FUTURE SHOWS

Philadelphia, Pa. *January 25–28*

Eleventh Plant Maintenance & Engineering Show and Conference (Convention Hall). Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

San Francisco, Calif. *February 16–17*

Tenth Annual California Statewide meeting of the Governor's Industrial Safety Conference (Fairmont Hotel). Michael Flagg, Coordinator, % Dept. of Industrial Relations, 965 Mission St. (Room 400), San Francisco, Calif.

Fort Wayne, Ind. *March 15–16*

1960 Northeastern Indiana Safety Conference and Exhibit. Ivan A. Martin, Safety Council Manager, Chamber of Commerce Building, Fort Wayne, Ind.

Boston, Mass. *March 21–22*

Thirty-ninth Annual Massachusetts Safety Conference and Exhibit (Hotel Statler). Bert Harmon, Manager, Massachusetts Safety Council, 54 Devonshire St., Boston 9, Mass.

New York, N. Y. *March 28–April 1*

Thirtieth Annual Greater New York Safety Convention and Exposition. (Statler Hilton Hotel.) William J. Farley, convention secretary, Greater New York Safety Council, Inc., 60 E. 42nd St., New York 17, N. Y.

Berkeley-Oakland, Calif. *Mar. 29–30*

Eighth Annual Northern California Safety Congress & Exhibits, (Hotel Claremont). Clinton W. Dreyer, managing director, Eastbay Chapter National Safety Council, 1322 Webster St., Oakland 12, Calif.

Los Angeles, Calif. *April 11–13*

Seventh Annual Western Safety Congress and Exhibit (Ambassador Hotel). Greater Los Angeles Safety Council, 3388 W. 8th St., Los Angeles 5, Calif.

Detroit, Mich. *April 12–14*

Thirtieth Annual Michigan Safety Conference and Exhibit (Sheraton-Cadillac Hotel). Ben Duguid, executive secretary, % Allstate Insurance Co., Detroit, Mich.

THE DOWNFALL OF THE ACCIDENT CYCLE

ACCIDENT...
An Event That Takes Place Without One's Foresight or Expectation.
PREVENTIDENT...
An Avoidable Event That Takes Place Without Using One's Foresight To Prevent That Event.

Fig. 2: Photo of poster placard showing difference in definitions of word Accident and coined term Preventident.

by **EDWARD E. ZANE**
Plant Superintendent
Prosperity Service Stores, Inc.
Long Island City, N. Y.

An event that takes place without one's foresight or expectation—that's the dictionary definition of an "accident."

But if we consider the accidents we have investigated in the past, how many of them can we say were truly **unforeseen or unexpected?** What about. . . .

. . . the fellow who operates a grinding wheel without wearing his goggles, even with a warning sign attached to the machine, and then finds himself in a hospital minus an eye?

. . . the fellow who has to step over a split rung on a ladder (too lazy to get another ladder), and then on the way down finds himself sprawled on the floor?

. . . or the he-man who likes to show off his strength to his coworkers, lifts with back bent, and finds himself with a back sprain or hernia?

These injuries are hardly unexpected, and therefore can we call them "accidents"? If we are to use the word "accident," then it should have a much more limited use than is ordinarily given it. H. W. Heinrich, in his book, "Industrial Accident Prevention," points out that two percent of all accidents are unpreventable, while 98 percent are of a preventable type. We believe the word "accident"—as an unexpected or unforeseen event—should only be applied to that two percent of occurrences that are unpreventable.

What about the 98 percent that are preventable? If I may coin a word to describe the preventable event, then I believe that word would be "Preventident." It might be defined as: "An **avoidable** event which takes place **without using** one's **foresight** to **prevent** that **event**." With this definition in mind, let's see what our company has accomplished in its two-year program of "Preventident Prevention."

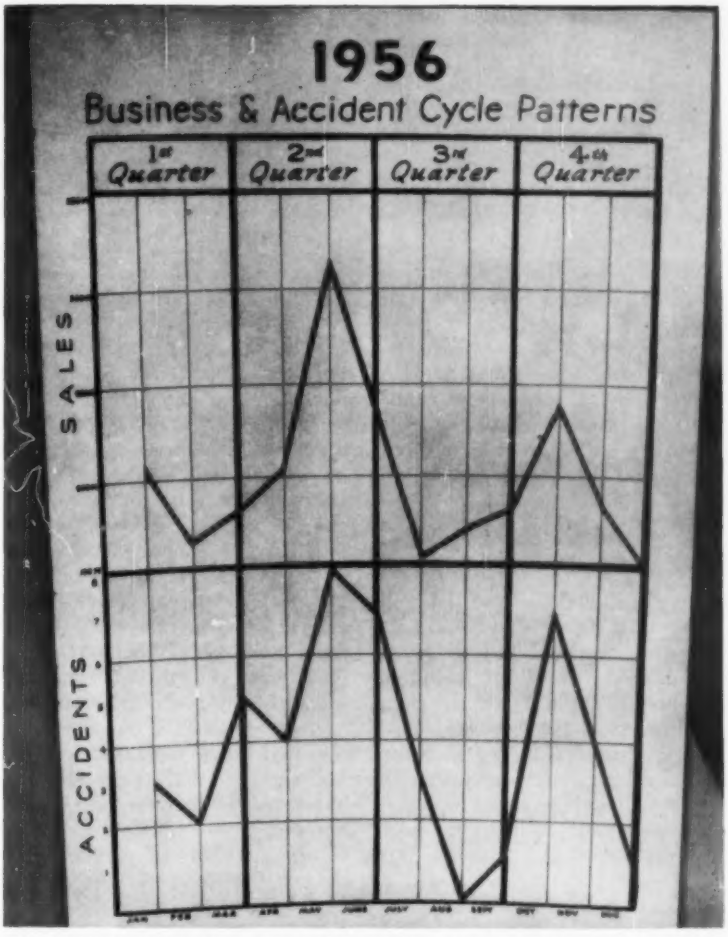


Fig. 1: Photo of chart used to point out the close similarity which existed between the business and accident cycles prior to Safety Program launching.

The top half of the chart in Figure 1 reflects our "Business" cycle, which is a highly seasonal one. This pattern remains constant in spite of actual dollar sales variation from year to year. You will notice that this graph is broken down into 4 quarters. January, February and March are low volume months in our particular business. However, during the months of April and June our volume more than doubles while in the month of May it triples. July, August and September on the other hand is the lowest volume period. Going into the 4th quarter of the year, the cycle reflects a sharp increase in volume in October, and tapers down to near summer volume in November and December.

Now look at our accident record for the year 1956, as shown in the lower part of the same chart. Quite

Figs. 3, 4: Plant Dry Cleaning Dept. pressing equipment which at one time contributed to greatest part of burn accidents.

a similarity isn't there? Other companies in a highly seasonal business, should draw similar graph charts for study. If a similarity between your business and accident record exists, the causative factors will soon reveal themselves. Upon eliminating these factors an out-of-control pattern such as this will soon disappear.

Why the Pattern?

We concluded that the sharp increase in the number of accidents during the April, May, June period was largely due to our taking on new help to build up our crews in the various departments to peak volume levels. This lead us to believe, that our safety indoctrination policy for handling new employees was inadequate. This cycle further indicated that our training procedure for new personnel must indeed have been poor. Not enough emphasis was being placed upon developing safe work habits in operating the various machines in our plant for the new employees as well as the "Old Timers." We found that the training itself was only "sometimes" done by the supervisor. However, if he was too busy or didn't feel like bothering, the training assignment was delegated to one of the operators in his particular department. The selection of the trainer-operator in most cases was based on a good production record rather than on qualifications as an instructor.

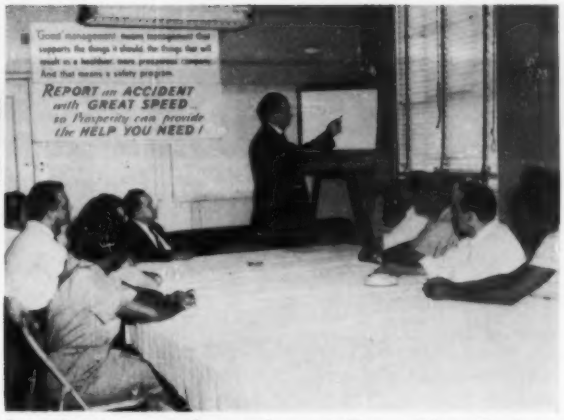
A closer look at our operations revealed that maintenance and housekeeping in the various departments was in many instances under par and overloaded with hazardous conditions. During the peak season, we were all too busy to report machinery that was not functioning properly, too busy to correct operators who had developed unsafe work habits. Our primary objective was to meet production schedules. This was done unknowingly at the sacrifice of maintaining safety in our operations.

When an accident occurred, in many instances the person involved would make no attempt to report the injury to the supervisor and would visit a doctor for treatment upon returning home. The company would learn of the accident days, sometimes weeks later. In some instances only after receiving an accident form from the doctor. Little or no attempt was made to determine the cause or causes of accidents and to correct the conditions. All of these things are what we uncovered in our primary investigation of determining the reason for our problems.

Fig. 7: Employee is shown receiving a five dollar award from representative of company for her successful entry in Safety Slogan campaign at the plant.

Analysis Very Revealing

A thorough analysis of our 1956 accidents was quite revealing. All accidents which had occurred during this year were broken down according to departments and type of injury in order to obtain more specific information and pinpoint the weaker areas. We found that almost 40 percent of our accidents were in the category of pressing accidents (Figures 3 and 4). This fact confirmed our thinking that new personnel as well as the old timers were not properly trained in operation of their machinery. The supervisors had not been made aware of the seriousness of this



Figs. 5, 6: First of two photos shows Safety Committee deep in conference, second supervisory staff's monthly gathering.

situation. The fact that our accident occurrence varied with the season certainly indicated that when we were busy, we were just as busy with accidents as we were with processing work. In lower volume periods the reverse was true.

We believe that the substantial drop in the number of accidents during the 1st, 3rd and 4th quarters by comparison to the 2nd peak volume quarter was primarily due to the following factors:

(1) The pressure of peak loads had been eliminated.

2. New people hired during the season had now become better acquainted with their jobs.

3. Our work crew during these periods was whittled down in the main to experienced personnel.

The answer to **Why The Cycle?** was now becoming more apparent. We had obtained the facts, analyzed them and interpreted them. Now—how were we to attain a controlled accident record and guard against the continuance of the existing cycle? We were determined to change the pattern. We adopted the philosphy that **history need not repeat itself,** and accepted the word **preventident** and its definition.

Breaking the Pattern

During the month of June 1957, top management together with an insurance safety engineer met in order to determine the best method of attacking the problem at hand. In organizing our program, the principles involved were:

1. Emphasis on safety the first moment an employee came into the company, that is, at the selection level.

2. Maximizing participation in the program through supervisory meetings, committee meetings and inspection groups.

3. Using a positive approach at the employee and supervisory levels.

We well realized that if any program were to be successful, we would first have to create interest and enthusiasm in safety among our entire supervisory staff. We had to make them aware of the seriousness of our problem and how vital their position as supervisors is in developing and implementing a sound safety program.

Our first step was to have a meeting with all departmental supervisors in production and sales. At this meeting we discussed our past performance and pointed out to them all the factors which our investigation indicated were contributing towards the poor record we had chalked up. This presentation was made by the president of our company, and was followed by a half hour lecture on accident prevention given by the insurance engineer. We stressed the humane approach to the problem of safety and what it meant for their workers, to the efficiency of their departments and to the company. We emphasized the fact that as members of the management team it was their responsibility, as it was ours, to protect every employee in the organization against injury.

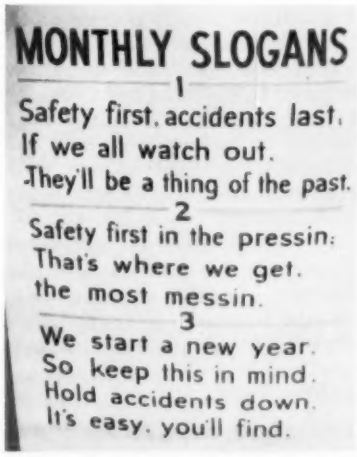


Fig. 8: Some of the Safety Slogans.

Nucleus of Program

We then opened the floor for discussion. Many ideas came forth from the group. The thoughts and ideas compiled from that meeting gave us the nucleus of our safety program.

During a subsequent management meeting a safety program was formulated and presented to our supervisory staff at a meeting on July 1st, 1957. This was **their** program.

Safety Committee: A Safety Committee consisting of the insurance company representative, the plant superintendent, the laundry division manager and the drycleaning division manager was organized. This group meets once a month to review the accident record for the previous month and sees to it that the program is being carried out. (Figure 5) At these meetings, discussions are held regarding any injuries which may

(Continued on page 25)

resurfacing compounds for industrial floors: part II.

by **JOHN B. CALKIN**
President
and **W. R. CRANDALL**
Coordinator of Laboratories
Calkin and Bayley, Inc.
New York, N. Y.

The selection of floor resurfacing materials usually depends on the type of traffic to be provided for, the kind and condition of the existing floor, and the prospective exposures to which the floor is subjected, such as water, oil, solvents, and chemicals. In Part 1 of this article, published in the November issue of "Safety Maintenance," the authors discussed the characteristics and applications of concrete and oxychloride cement as resurfacing materials.

Asphalt Mastics

Conventional, asphalt-flooring "mastic" (pasty substance) is a mixture of sand or other hard aggregate with fusible bituminous binder.

• **Characteristics.** Resistance to heavy traffic is excellent except for a tendency to creep or form ruts under excessive loads. As a top dressing, mastic effectively waterproofs the under floor in wet locations and is often the preferred material for that reason.

Resistance to water and dilute solutions is excellent. For some types of chemical plant work it is disqualified by its low resistance to heat, solvents, and some active chemicals. The bond to wood or concrete is good, but lifting of floor paint sometimes causes thin top dressings to loosen.

• **Application.** It is applied hot, and compacted by rolling. Binder specifications provide for a range of melting points and for variable resistance to heat, weathering, oil, alkalies and other chemicals. Mechanical properties, on the other hand, vary with the grading of the aggregate and its bulk ratio to the binder.

Asphalt Emulsion With Aggregate

For resurfacing on a scale too small to justify the use of heat processes and special equipment, a number of ready-mixed compounds are available for trowel application.

• **Characteristics.** These are composed of asphalt emulsion and mineral aggregate; with them is supplied asphalt emulsion to be used as a primer on all surfaces. Various deep colors are available, including the natural brown.

Since these products are based on the same raw materials found in hot mastic, they share its merits and faults in some degree. Material and labor costs are low, and resistance to traffic is satisfactory if the material is well bonded to a rigid under-surface. Creeping and rut formation may occur, but repair patches are quickly applied and adhere well. Resistance to heat, oil, solvents and some active chemicals is poor; resistance to weather or the long-continued action of water or alkali solution is not equal to that of hot mastic.

• **Application.** Under-floors are prepared by patching and cleaning. A brush coat of emulsion is then applied and allowed to dry. Resurfacer is troweled on and protected from traffic until dried through.

A typical material covers 8 square feet per gallon at a thickness of 0.2 inches. At this spreading rate, resistance to heavy traffic is probably not to be expected. Feather edges should not be exposed to traffic. Although adhesion to clean surfaces is good, the primer sometimes causes loosening because it lifts the floor paint.

Asphalt-Modified Hydraulic Mortar

In one of the more popular types of industrial resurfacer, adhesion and some degree of resilience in hydraulic mortar can be improved by blending it with asphalt emulsion. Usually the same vendor will supply both emulsion and Portland or aluminate cement, to be mixed with aggregate by the user and troweled on over an asphalt primer. Here again, several deep colors are available, including the natural brown.

• **Characteristics.** When the recommended minimum thickness of half an inch is well bonded to a rigid under-surface, its resistance to heavy, steel-tire traffic is good. But if feather edges are made they should not be exposed to traffic.

Although weather resistance is claimed for a number of general-purpose compounds, it is well to note that a more conservative view is taken by one major producer who supplies both interior and exterior grades. Resistance to washing and wetting is good, but many products of this kind are softened by long soaking in solutions of detergent or alkali—sometimes even in water. Attack by dilute acids is slow. Resistance to oils, solvents, and some active chemicals is poor.

• **Application.** The under-floor is prepared by patching broken or weak areas, renailing any loose floor boards, and cleaning. It is then coated with asphalt emulsion, either that supplied for mixing, or a similar one. Surfacer is troweled on as for other cement mortars and protected until it has set hard. As in using ordinary mortar, drying out must be prevented for at least 24 hours.

The floor so formed is non-dusting and easily cleaned by washing. Ruts may form under excessive loads, but are quickly and cheaply filled with fresh material. Although

adhesion is excellent on almost any clean surface, lifting of floor paint by the primer may cause the layer of resurfacer to loosen. Floor paints or other solvent-mixed coatings are unsuitable for application over asphalt compounds.

Latex-Modified Hydraulic Mortar

Similar to asphalt-modified mortars in principle and performance—competitive with them on annual cost—are the various hydraulic mortars modified with natural rubber latex, approximately in the ratio 10 pounds of rubber solids to 100 pounds of Portland or aluminate cement.

• **Characteristics.** The higher price of rubber-modified material tends to be offset by its superior mechanical properties. Since a top dressing of a quarter of an inch in thickness is recommended as against half an inch of asphalt-modified mortar, there is only half as much material to be mixed and laid, and the labor cost is thus sharply reduced.

Vendors regularly furnish separate packages of dry-mixed mortar and latex to be mixed on the job. The natural color of the material is that of the cement used, and pale tints, or even a fairly good white, can be provided. A minimum thickness of a quarter of an inch is recommended for heavy traffic. Some vendors state that feather edges are satisfactory. By and large, however, feather edges should not be exposed to traffic. And all porous or doubtfully-clean areas should be primed.

Latex-modified mortar adheres well to wood, concrete, or almost any rigid flooring surface, and when well bonded is resistant to heavy, steel-tire traffic. Its surface does not dust or chip. Though resistant to sparking caused by impact, it is non-conductive and is in no sense an anti-static material.

Vendors' claims relating to chemical and solvent resistance do not agree in all respects. Resistance to water, detergents, and dilute alkalis is high. Attack by dilute acids, oils, and most solvents is slow, but the material is disqualified for many chemical-plant uses by its low resistance to concentrated acids, rubber solvents, and active oxidizing agents. Weather resistance can be provided for by correct compounding.

• **Application.** Under-floors are prepared by patching, renailing loose boards, and so on, followed by thorough cleaning. Porous or doubtfully-clean surfaces are primed, as are areas where feather edges are to be made. Since latex primer has little or no tendency to lift floor paint, the mortar, mixed as directed with latex, is applied and cured like ordinary hydraulic mortar with due regard to the risk of premature drying out.

The finished surface responds well to the usual maintenance, including the use of wax. Adhesion of repair patches to damaged areas is excellent.

• **Neoprene Modifiers.** Although less widely used than the corresponding natural-rubber products, Portland or aluminous cement mortars modified with neoprene latex are supplied by at least two manufacturers of floor resurfacers. These products resemble the compositions similarly modified with natural rubber, but in the opinion of many experts give generally better service than natural rubber when exposed to oils, petroleum fuels and solvents.

Resinous Compounds

Of special interest among coating resins is a group of solvent-free

liquid materials which set at room temperature to form exceptionally tough, adhesive, resistant films. Unsaturated epoxys are representative of this group, since they can be formulated to set either by exposure to air or in thick layers by the action of a catalyst. They have been used in various floor situations for somewhat different purposes, four of which are described below.

• **Non-Skid, Brush Coatings.** These are composed of air-drying epoxy resin and hard abrasive—for example, carborundum. They adhere exceptionally well to wood, concrete, ceramics, and metals. They also are very resistant to mechanical wear, water, steam, oils, solvents, and all but the most active chemicals. These products are commonly used on stairs and traffic lanes to reduce the slipping hazard, and can be recommended for use in almost all wet or slippery areas, including those of chemical plants. Recommended spreading rates are usually between 20 and 50 square feet per gallon of ready-mixed coating.

• **Chemical-Resisting Floorings.** Similar resins mixed with catalyst on the job have been used in chemical plants as cements for setting acid-proof floor tile, and also as a trowel coating for the protection of floors against chemical and solvent attack. A typical situation is that in which concrete and metal surfaces are to be protected against brine, acid solutions, fatty acids, or the like. Adhesion of the recommended 0.13 inch thick coating is perfectly reliable over rigid surfaces. Obviously it is possible, though not always necessary, to reduce slipping hazards by adding sand or abrasive to such coatings.

• **Wear-and Soil-Resisting Floorings.** Still under development is the application of resinous trowel coatings—with or without aggregate—to interior traffic lanes for the sole purpose of resisting heavy wear and soiling. Adhesion, abrasion resistance, and toughness are reported excellent in tests made on wood floors.

• **Mold- and Bacteria-Resisting Floorings.** A specialized but important occasion for the use of epoxy trowel or brush coatings is sometimes encountered in dairies and food processing plants. Wood and porous concrete in damp areas will invariably harbor molds and bacteria which cannot be sufficiently controlled by the use of hot water and disinfectants. A full coat of epoxy resin compound applied to such surfaces keeps them dry, and can itself be rendered nearly sterile by the usual wash with hot water and detergent.

Patching and Cleaning

Any resurfacing compound has some value for patching underfloors. However, not all are equally effective. Experience teaches that such repairs should generally be made with the original flooring material (or a similar one), in order to equalize the hardness of the floor and its behavior under heavy loads.

• **Patching Characteristics.** In a common but troublesome situation, small patches made with hydraulic mortar dry out before acquiring a full 24 hour set. In this situation, a flash set mortar may be made with roughly equal parts Portland cement, aluminate cement, and dry sand. About an ounce each of hydrated lime and plaster-of-Paris added to 6 pounds of this mixture cause it to set in 5 minutes. In this composition the plaster is a retardant.

Polyvinyl acetate is one of the few chemically-resistant, high-strength adhesives which bond strongly to Portland cement mortar or concrete. One of the principal vinyl producers states that a mortar composed of cement, finely ground silica, and certain grades of polyvinyl-acetate latex may be troweled out to a durable feather edge if applied over clean concrete. Although current prices may not encourage its general use as flooring, it appears to be a serviceable and widely useful patching material. Explicit recommendations, of course, should be solicited from manufacturers of polyvinyl acetates before actual work is started.

• **Cleaning Characteristics.** Successful preparation comprises the complete removal of cleaning agents as well as other surface contamination. For this reason it is desirable to use them in a suitable order, usually as follows:

(1) Solvents, if needed, for oil, grease, wax, and the like;

(2) Alkaline paint removers, if needed;

(3) Detergent solution with brushes; and finally

(4) Water from hose.

When troublesome contamination is established over a large area, the use of sanding machines on wood, or power brush-hammers on concrete, should be considered. By these means, the use of liquids may be avoided altogether. In all cases, dust should be removed from rough surfaces by vacuum cleaning or hosing. Sweeping is inadequate. Note: If muriatic acid is used on concrete, hosing with water must be particularly thorough.

Wholesale and Retail Trade Injuries

Injury rates in wholesale and retail trade showed little change in 1958, compared with 1957, according to reports compiled by the U. S. Department of Labor's Bureau of Labor Statistics.

The average in 1958 was 12.0 disabling injuries per million man-hours worked in trade and 11.9 in 1957. Only 4 of the separate trade classifications showed changes of one full frequency-rate point.

Retail apparel and accessories stores reported the lowest rate (3.3), followed by variety stores (4.8), miscellaneous general merchandise stores (5.2), and department stores (7.9). The highest rates were 23.1 for lumber and building materials dealers and 20.8 for wholesale and retail dairy products.

The injuries reported in 1958 averaged 44 days of disability per case, about the same as in 1957. The standard severity rate for 1958 was 483 days of disability for each million man-hours worked.

From the survey data it was estimated that a total of 340,000 workers were disabled by injuries in wholesale and retail trade during 1958, the same as the estimate for 1957. Of these injuries, an estimated 1,200 resulted in death and 7,800 in some permanent impairment. The remaining 331,000 injuries each disabled the worker for one full calendar day or more.

INSULATED CLOTHING KEEPS EMPLOYEES DEFROSTED

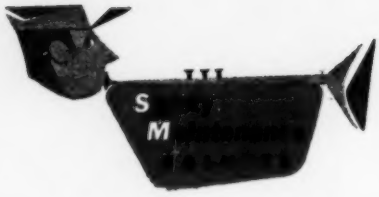
A thin, flexible sheet of polyurethane foam—only ¼-inch thick—protects industrial freezer workers from biting cold as low as –30 F. In addition to reducing out-of-freezer time, foam-lined garments also contribute to worker safety. Their lightweight and lack of bulk offer wearers full freedom of movement, particularly important to operators of materials handling equipment.

Although designed primarily for the frozen food, ice cream, meat and other food industries, this clothing will also prove useful to workers in outdoor occupations, such as marine, aircraft, utility, and construction fields, as well as sportsmen, and military personnel stationed in the Arctic.

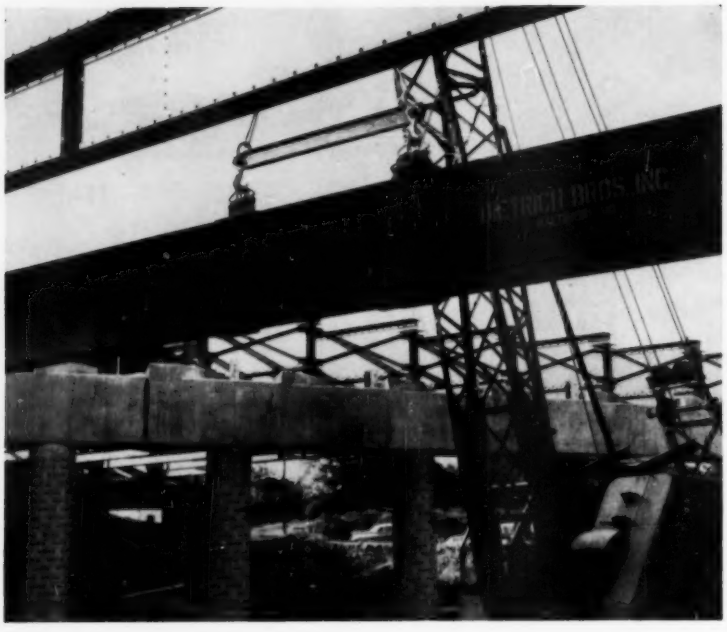
Based on diisocyanates, such as those supplied by Allied Chemical's National Aniline Division, the foam combines chemical inertness with light weight, strength and superior insulating properties. Because of polyurethane's hygienic characteristics—odorless, non-absorbent, resistant to sweating, mold, mildew

Displaying new style freezer clothing, using polyurethane foam insulation. It protects, permits free movement.

Below: Several layers of quilted ¼ inch polyurethane foam are cut into garment sections at one time. Insulating value of ¼ in. polyurethane foam is about the same as ½ in. of eiderdown, kapok, fur or fiber glass, ¾ in. cotton batting.



A SAFETY IDEA



Safe Handling of Girders

Greater safety, freedom from load damage are provided during the handling of heavy bridge girders when metal-mesh slings are used. The girder shown here is over 100 feet long and weighs over 28,000 pounds. The slings are 16 inches wide by 256 inches long. Safety is provided because the spiral loop construction of the metal mesh sling will not snap suddenly and drop the load, endangering men and equipment on the job site. Freedom from load damage is provided because the sling in this choke hitch places the weight of the load on the heavier, bottom flange of the girder. Other methods of lifting, such as the use of clamps, require that the lift be made from the lighter top flange, thus risking the possibility of bending the flange. In this rig, the flexible sling wraps completely around the load without even cutting through the coating of protective paint on the girder.

Photo supplied by: The Cambridge Wire Cloth Co., Cambridge, Maryland.

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and vermin—it is particularly suitable for use in the food industry. Foam interlining cannot shrink, mat, bunch, shift, or lose its insulating effectiveness, despite countless commercial launderings or drycleanings, and it will not stiffen or crack at low temperatures.

For industrial clothes the polyurethane foam interlining is quilted to the lining fabric before being cut and sewn. Its tailoring qualities are excellent; drape and shape retention contribute to the fine appearance of the garments, even after they are washed and drip-dried.

Polyurethane foam is usually produced by the reaction of tolylene diisocyanate with a polyester or polyether, together with water and other ingredients. As the reaction proceeds, carbon dioxide gas bubbles are generated, expanding the mixture to twenty times its original volume. The result is a large foam "bun," which is then sliced into soft, flexible sheets.

The extraordinary insulation offered by urethane foam is due to the thousands of air spaces which trap body warmth and prevent entry of cold air. Its k factor (measurement of thermal conductivity) is 0.27; this is even lower than natural cork.

Foam Interlining is Less Bulky

About ¼ in. of polyurethane foam interlining provides the same warmth as ½ in. of feathers, eiderdown, fur, kapok, or fibre glass, ¾ in. cotton batting, or 1 in. wool batting. And one square yard of ¼-in. foam weighs only 6 oz., about ⅓ that of other types of interlinings.

Equally important: polyurethane contributes to the comfort of countless allergy sufferers, who cannot tolerate protein fibers.

Because of the foam's pliability and lack of bulk, it is more easily cut than batting, fur or down linings. Sewing rooms are cleaner too, due to the absence of flying feathers, lint, or invisible glass splinters. Furthermore, the foam is so strong and tear-resistant that no special care or equipment is required in cutting or sewing.

Besides feeling less bulky and heavy, these new freezer clothes actually "breathe." Because they allow body perspiration to evaporate, they do not feel as "clammy" as old-style garments. This comfort results in higher production rates, since workers spend more time on the job, and less outside the freezer.

Foam is purchased already sliced into ¼-in. sheet, in rolls 42 in. wide. After being quilted to the lining fabric, 70 denier nylon, in a 2-in. diamond pattern, it is cut and sewn. Outershell is treated cotton cord. Fabrics used are completely washable, so that the garments may be home laundered, then hung to drip dry. The foam interlining dries quickly and always retains its original shape, so that clothes look smooth and unwrinkled, even without ironing.

Pictures by courtesy of Mixon and Davis.

safety tips

for BATTERY MAINTENANCE

Here's a quick summary on how to get best performance and longest service life out of your stationary-type industrial storage batteries. Developed by Exide Industrial Division of The Electric Storage Battery Company, these condensed operating rules—which apply particularly to lead-antimony alloy batteries of low specific gravity, nominally 1.210—are good guideposts for proper maintenance of most types of lead-acid stationary batteries used for:

switchgear and supervisory control
stand-by power
emergency lighting
railway signaling and switching
telephone central exchanges
PBX and PAX switchboards
microwave
laboratory instruments
fire alarm and police telegraph systems
rural electrification
general industrial power service

General Rules for All Batteries

Install the battery in a cool, dry location with normal ventilation.

Keep the outside of the battery clean and dry.

Add water approved for battery use to the maximum level mark, as required.

The addition of acid or electrolyte never is necessary unless some actually is spilled. In this case, follow the manufacturer's directions precisely.

Do not permit any open flame or sparks near the battery.

Tighten connector bolts of all cells yearly.

Keep written records of amount of water added, voltage and specific gravity readings.

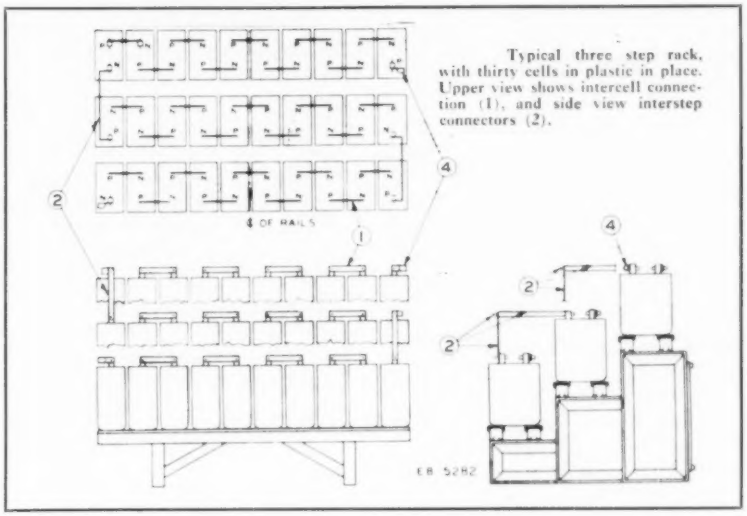
Float-Charging Batteries

If your battery is connected continuously to the electrical system with which it is used and normally kept fully or nearly fully charged . . .

Keep the charger adjusted so that battery terminal voltage will average 2.15 volts per cell.

Give the battery an equalizing charge by increasing charge voltage to the highest limit of the equipment, but not above 2.50 volts per cell. Do it according to battery manufacturer's instructions:

- **(a) At regular intervals, perhaps monthly,**
- **(b) After known use or discharge of the battery,**
- **(c) When specific gravity of any cell is 10 points below full-charge value,**
- **(d) When voltage of any cell is more than .05 volt below the average of the battery when floating.**



Typical three step rack, with thirty cells in plastic in place. Upper view shows intercell connection (1), and side view interstep connectors (2).

Manually Cycled Batteries

If you start your charger manually each time you charge your battery . . .

For once-a-week or less frequent charging, charge until all cells gas freely and until both half-hourly specific gravity readings of the pilot cell and the voltage of the entire battery show no further increase for a one-hour period. This is an equalizing charge.

For charging more than once a week, charge until all cells are gasing and until the specific gravity of the pilot cell is within 5 to 10 points of its most recent equalizing-charge reading. Every sixth or seventh time, continue the charge into an equalizing charge.

System-Governed Batteries

If your battery is connected continuously to an electrical system on which the load fluctuates rather widely and where a constant charging current is used . . .

Adjust the charge control to an average current value that will keep the specific gravity within 10 to 15 points of its full charge value, and yet will not require more than a normal amount of water.

Give an equalizing charge monthly.

Maintenance Show To Preview the '60s

Starting its second decade, the 11th Plant Maintenance and Engineering Conference will feature a broadly revised program to meet the changing needs of industry as it progresses toward more automatic production during the 1960s. The annual conference is held concurrently with the Plant Maintenance and Engineering Show. Both events will be held at Convention Hall, Philadelphia, the show from Jan. 25 to 28, and the conference from Jan. 25 to 27.

They have been held on the East coast only twice before, in 1952 and 1956. The show is expected to be the largest in its history with five acres of exhibit space devoted to the products and services of more than 400 companies.

New Topics

Among the new topics added to the 1960 program are "Research and Development Techniques in Maintenance," "Plant Engineering in Planning to Combat Disaster by Flood and Tornado" and "What the Plant Engineer Should Know About Building Design and Construction."

Additional sessions and increased emphasis are scheduled for such topics as the industrial engineering function in maintenance, the reduction of maintenance costs, maintenance factors in purchasing new equipment, and electrical maintenance. Prevention of air and water pollution will continue as a major topic, and a session on the maintenance of materials handling equipment will be returned to the program.

Ten round-table discussions will consider the individual problems of particular industries. These include chemical plants; food-processing plants; foundries; metal-working and metal-fabricating plants; petroleum refineries; pulp and paper mills; research, development and pilot plants; rubber mills and rubber product plants; steel mills, and textile plants.

The big general session on the opening day will be devoted to a report of a chemical manufacturing company which has been a leader in plant maintenance and engineering procedures. The report will discuss methods developed, applied and tested during the past ten years.

Other conference topics include "Maintenance Stores Control," "Training Maintenance Apprentices and Supervisors," "Maintaining Electronic and Other Control Systems," "How to Use Industrial Engineering Techniques in Maintenance," "Maintenance Problems Peculiar to Small Plants," "Matching Control Maintenance With Systems Engineering," "Recent Welding Advances Adaptable to Maintenance," "Sanitation," "Organization and Administration for Electrical Maintenance in Large Plants," "Getting at True Maintenance Costs for Purposes of Comparison," "How to Plan and Schedule Maintenance Work for Effective Control."

Also, "Lubrication of Plain and Anti-Friction Bearings," "Labor Relations in Plants Having Union Workers," "Maintenance of Yards, Grounds and Tracks," "The Practical Use of Incentives in Maintenance," "Data Processing Equipment in Maintenance Work," "Recent Advances in Predicting the Life of Electrical Insulation," "Preventive Maintenance at Work" and "Evaluating Maintenance Performance."

Visitors who wish to obtain hotel information or rapid registration cards for the show or conference should write Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

"Don't do it. You'll have a lost-time case against your record . . . me!"

2nd Quarter Rates of Injuries Rise

The injury-frequency rate for manufacturing continued its upward trend with a 6 percent increase between the first and second quarter of 1959, according to preliminary reports compiled by the U. S. Department of Labor's Bureau of Labor Statistics.

The second-quarter average—11.4 disabling injuries per million man-hours worked—was 10 percent above the previous year, but was still below the 1957, or any previous second-quarter rate. In each month, the 1959 injury rate has been above its 1958 level. The largest increase occurred in May, and both the May and June rates were slightly above those for 1957.

Increases in injury rates were fairly well distributed among the 138 industry classifications for which data were compiled. Increases of one full frequency-rate point or more between the first 6 months of 1958 and 1959 were recorded by 66 of these industries; however, 11 achieved rates one full point or more lower in 1959 than in 1958, while 61 showed little change.

The six-months average for the miscellaneous wood products industry increased from 23.7 in 1958 to 30.3 in 1959; metal coating and engraving, from 21.7 to 27.2; miscellaneous nonmetallic mineral products, from 12.5 to 17.7; and hand tools, files, and saws, from 15.4 to 20.5.

High-rate industries for the first 6 months of 1959 included: logging—63:0; sawmills and planing mills—40.1; poultry and small game dressing and packing—37.3; structural clay products—35.0; miscellaneous wood products—30.3.

Outstandingly low rates were achieved by: synthetic rubber—1.9; miscellaneous communication equipment—2.1; synthetic fibers—2.3; radio tubes—2.3; electric lamps (bulbs)—2.5; explosives—2.7; aircraft—2.7.

Electrical Industries Show

With new product development in the electrical industries as its motivating force, the 5th National Electrical Industries Show looms as the largest merchandizing showcase in the history of the electrical industry when it takes place March 6–9th at New York's Coliseum. Industry response from exhibitors for the 1960 show points to the most extensive and complete electrical show in the country.

Schedule 300 Booths

Harold R. Meyer, director with William S. Orkin of the American Electrical Industries Expositions, Inc., producers of this 5th National Electrical Industries Show, reports that over 300 booths will be displayed at the show, depicting all phases of the industry and showing for the first time the very latest in electrical construction materials and apparatus, wiring devices, electric heating and all other pertinent phases of the industry, with special emphasis on the growing electric tool market.

A special feature of this year's exposition will be an animated educational display concentrated around the show's timely theme "1880 to 1960: An eighty year span from first installation of electric current by Thomas Alva Edison to today's electricity by atom reactor." In this display area, donated by the show's management, will be many of Mr. Edison's first electrical achievements as well as the newest developments in creating electricity from atomic energy.

See 20,000 Attendance

Sponsored as it has been since 1952 by the Eastern Electrical Wholesalers Association (EEWA), the Show has already received registrations for the four day event which is open only to electrical distributors, contractors, electricians, engineers, utility men, builders, architects and other fields allied to the electrical industry. Judging by this unsolicited response, producer Meyer predicts an attendance of over 20,000.

NEW

AMERICAN LAFRANCE

2½ lb. Dry Chemical

Fire Extinguisher

The small extinguisher with the BIG wallop! Now, from American LaFrance comes this new, larger-capacity portable extinguisher. Especially suited for small hazards, lift trucks, portable machinery, etc. Economically priced . . . ideal for replacing your vaporizing liquid units. And it's way ahead in features:

- **2½ lb. capacity, 4B:C rating**
- **Approved by Factory Mutual, Underwriters Laboratories, Coast Guard**
- **Lifetime shell, easily recharged**
- **One-hand, squeeze handle operation**
- **Tell-tale gauge, *positive* visual inspection**

The PDC-2½B is the latest addition to the complete line of American LaFrance dry chemical extinguishers. There are 6 sizes to fill your needs, from 2 lb. to 30 lb. Your American LaFrance Representative has the details. Ask him . . . or write us.

AMERICAN LAFRANCE

A DIVISION OF STERLING PRECISION CORPORATION

ELMIRA, N.Y., U.S.A.

In Canada, LaFrance Fire Engine and Foamite, Ltd., Toronto, Ont.

(For details, use Key # M-6 on Inquiry Card on page 1)

PART 3

Techniques of

Parts 1 and 2 of this article were published in the October and November issues of "Safety Maintenance," and outlined the danger points of mechanical equipment and described methods of guarding rotating and reciprocating machine parts, in-running nip points, and cutting actions. All of the material is based on "The Principles and Techniques of Mechanical Guarding" published by the Bureau of Labor Standards, U. S. Department of Labor and compiled by William G. Griffin and Sheldon W. Homan of the Office of Technical Services, under the direction of Robert D. Gidel, Chief, Division of Safety Standards and Services.

Guarding Punching, Bending and Shearing Actions

Punching, bending, and shearing actions differ from cutting actions in that material is not removed in the form of chips. This class of action is used primarily to form or shape metals, but may be used on material other than metal; as for example, plastics, fabrics, and papers.

Punching, bending, and shearing actions are particularly hazardous with respect to the severity of injury inflicted, many such injuries resulting in amputations or other permanent disability. As in the case of cutting actions, the hazard is at the point-of-operation.

Figures 14–22 are illustrations of machines which perform punching, bending or shearing actions and techniques by which they are guarded.

Guard Construction and Specifications

Machine guards to be effective must be built in accordance with recognized standards of construction and of performance. They must be designed so as to eliminate the hazard, they must create no hazard of their own, they must be sturdy enough to withstand normal wear, and they should not interfere with production.

Standards of construction and performance have been developed

Fig. 14: Guarding Punching or Bending Action by Enclosure Guards

Enclosure guards for punching or forming presses for use with strip feeding.

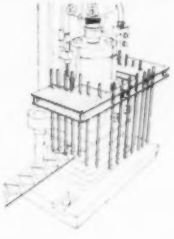
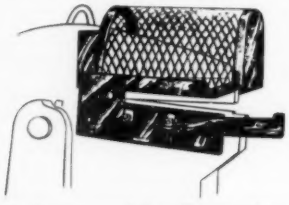
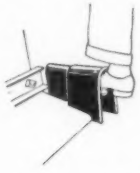


Fig. 15: Guarding Shearing Action by Enclosure Guards

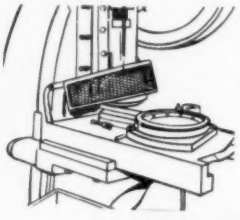


Enclosure guard for alligator shears.

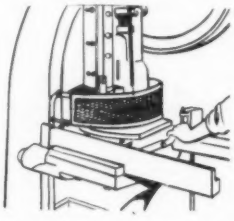


Treadle guards for presses and shears to prevent unintentional tripping.

Fig. 16: Guarding Punching or Bending Actions by Barrier Guards

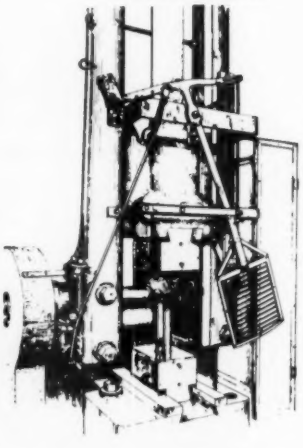


Stock is fed into die outside of danger zone.



PUNCH PRESSES

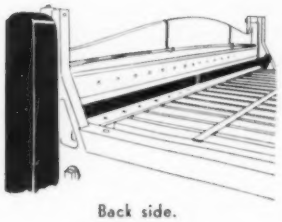
Hinged barrier guard closes automatically when sliding die is moved into position.



A barrier guard, operated by the tripping device of the press, is interposed in front of the plunger before plunger descends.

Mechanical Guarding

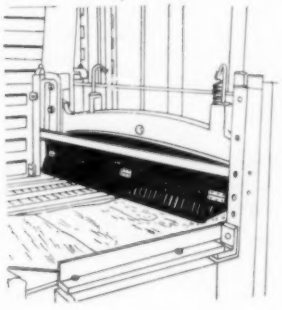
Fig. 17: Guarding Shearing Action by Barrier Guards

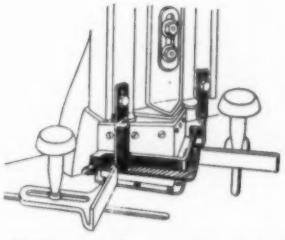


Back side.

VENEER CLIPPER

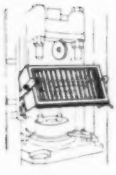
Front side. ⟶





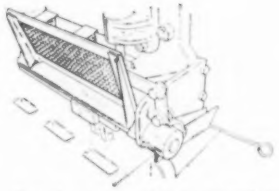
Barrier guard on paper corner cutter.

Fig. 18: Guarding Punching or Bending Actions by Interlocking Guards



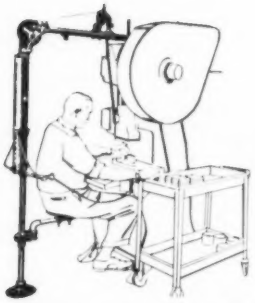
(LEFT) Gate guard on punch press. Guard is interlocked with tripping device of press so that plunger cannot descend until gate is in closed position.

(RIGHT) Photoelectric ray (electric eye) prevents operation of press while operator's hands are in the danger zone. Should not be used on positive clutch presses where ram continues its stroke after tripping of press.



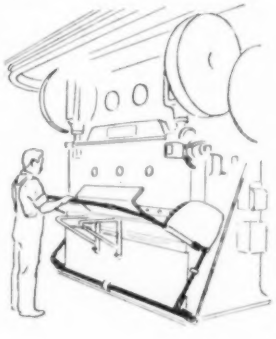
Guard open, starting control inaccessible, on this Guillotine Shear with 2-hand control interlocked with barrier guard.

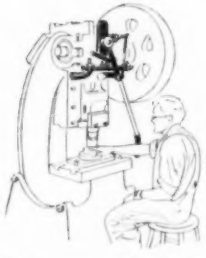
Fig. 19: Guarding Punching or Bending Actions by Automatic Guards



Pull-away guard. Operator's hands are pulled away from danger zone before the ram descends.

Power brake. Automatic device pushes operator away from danger zone when power brake is operated.





Push-away guard. Sweep guard pushes operator's hands away from danger zone before ram descends. Double sweep arms are preferable and barrier guards at the sides of the die to prevent the operator reaching around it are desirable.

Platen press. Barrier guard operated by the reciprocating crank, pushes operator's hands out of danger zone when press closes.

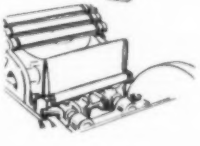
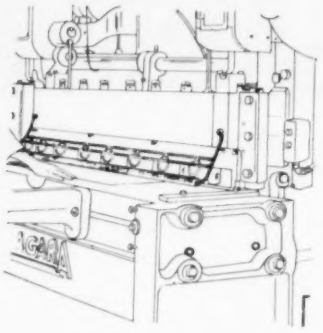
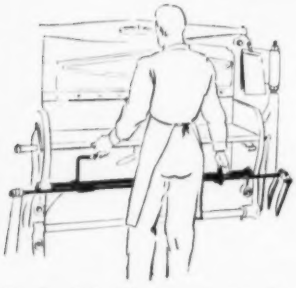


Fig. 20: Guarding Shearing Action by Automatic Guards

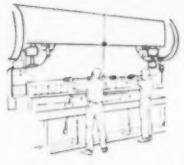


Power shears. Roller guard rests on sheet stock as it is fed into the shear. Descending ram will force the roller out, and roller pushes operator's hands away from knife. When ram goes up the roller will rest in vertical position.

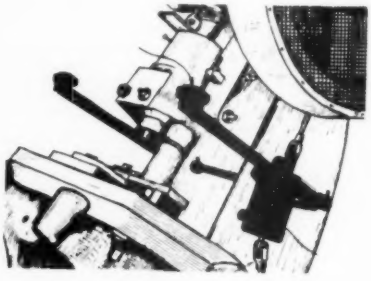
Fig. 21: Guarding Shearing Action by Remote Control Placement, Feeding or Ejection



Two-handed tripping device for paper guillotine shear.

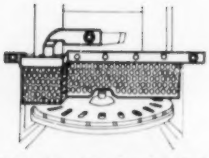


Two-man operated press with each operator required to activate two switches simultaneously.

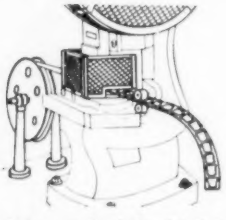


Punch press. Two-handed tripping device requires the simultaneous use of both hands to trip the press. On presses with non-interrupting stroke device should require continuous pressure on controls so operator cannot reach into press.

Fig. 22: Guarding Punching Action by Remote Control, Feeding or Ejection

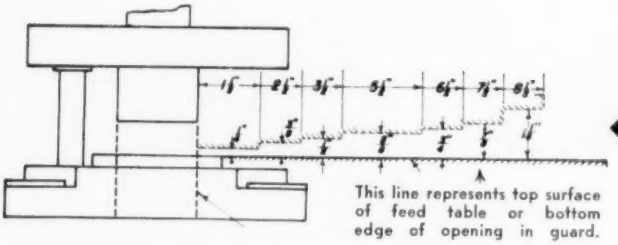


Rotating die. Stock is fed manually into rotating die and is carried automatically under the plunger.



Automatic feed. Stock is fed automatically into plunger, operator required only to restock feeding device.

Guarding by use of special tools. The use of specially designed hand tools for placing material into the press is also acceptable.



This line represents top surface of feed table or bottom edge of opening in guard.

Guarding punch press by limitation of ram stroke. If ram stroke is limited to 1/4 inch, enclosure is unnecessary. When enclosure die is necessary, size of openings should not exceed that shown for various distances.

and refined so that adequate guide lines are now available for anyone purchasing or building guards for most kinds of machines. On page 25 the details on guard construction and specifications are excerpts from the American Standard Safety Code for Mechanical Power Transmission Apparatus. Other details of machine guarding are contained in the American Standard Safety Code for the Use, Care, and Protection of Abrasive Wheels, the Safety Code for Power Presses and Foot and Hand Presses, the Safety Code for Forging and Hot Metal Stamping, the Safety Code for Mills and Calendars in the Rubber Industry, the Textile Safety Code, the Safety Code for Woodworking Machinery, the Safety Standards for Pulp and Paper Mills, the Safety Code for Laundry Machinery and Operations, and the Safety Code for Bakery Equipment.

Size of Framework Materials

(1) Minimum dimensions of materials for the framework of all guards except as noted in paragraph 3 shall be angle iron 1 in. x 1 in. x ⅛ in., metal pipe of ¾ in. inside diameter or metal construction of equivalent strength.

All guards shall be rigidly braced every three feet or fractional part of their height to some fixed part of machinery or building structure. Where guard is exposed to contact with moving equipment, additional strength may be necessary.

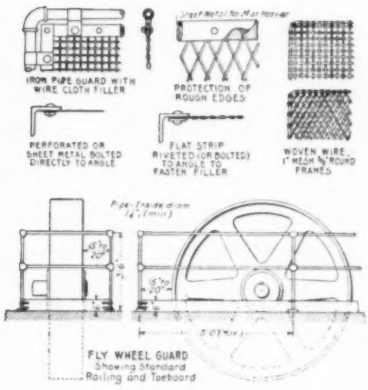
(2) The framework for all guards fastened to floor or working platform, and without other support or bracing, shall consist of 1½ in. x 1½ in. x ⅛ in. angle iron, metal pipe of 1½ in. inside diameter or metal construction of equivalent strength. All rectangular guards shall have at least four upright frame members each of which shall be carried to the floor and be securely fastened thereto.

Cylindrical guards shall have at least three supporting members carried to floor.

Size of Filler Materials

Material	Clearance from moving parts at all points	Largest mesh or opening allowable	Minimum gauge (U. S. standard) of thickness	Minimum height of guard from floor or platform level
	(Inches)	(Inches)		(Feet)
Woven wire	Under 2	⅜	No. 16	7
	2–4	½	No. 16	7
	Under 4	½	No. 16	7
	4–15	2	No. 12	7
Expanded metal .	Under 4	½	No. 18	7
	4–15	2	No. 13	7
Perforated metal .	Under 4	½	No. 20	7
	4–15	2	No. 14	7
Sheet metal	Under 4	...	No. 22	7
	4–15	...	No. 22	7
Wood or metal strip crossed	Under 4	⅜	Wood ¾" or Metal No. 16	7
	4–15	2		
Wood or metal strip not crossed .	Under 4	½ width		
	4–15	1 width		
Standard rail ...	Minimum 15 and Maximum 20			

Fig. 23: Acceptable Guard Construction


IRON PIPE GUARD WITH WIRE CLOTH FILLER
PROTECTION OF ROUGH EDGES
PERFORATED OR SHEET METAL BOLTED DIRECTLY TO ANGLE
FLAT STRIP RIVETED (OR BOLTED) TO ANGLE TO FASTEN FILLER
WOVEN WIRE 1" MESH N°12 ROUND FRAMES
FLY WHEEL GUARD
Showing Standard Railing and Toeboard

(3) Guards thirty inches or less in height and with a total surface area not in excess of ten square feet may have a framework of ⅜ in. solid rod, ¾ in. by ¾ in. x ⅛ in. angle or metal construction of equivalent strength.

Method of Fastening Filler to Frame

(1) With rivets or bolts spaced not more than five inches center to center.

(2) By welding to frame every four inches.

(3) By weaving through channel or angle frame, or, if No. 14 gage ¾ in. mesh or heavier is used, by bending entirely around rod frames.

(4) Where openings in pipe railing are to be filled in with expanded metal, wire mesh or sheet metal, the filler material shall be made into panels with rilled edges or bound with "V" or "U" edging of No. 24 gage or heavier sheet metal fastened to the panels with bolts or rivets spaced not more than five inches center to center. The bound panels shall be fastened to the railing by sheet-metal clips spaced not more than five inches center to center.

Note: Diamond or square mesh made of crimped wire fastened into channels, angle or round-iron frames, may also be used as a filler in guards.

Accident Cycle

(from page 13)

have occurred during the period to determine their cause and institute action to prevent their reoccurrence.

Inspections: To assist the committee we scheduled weekly plant safety inspection tours using departmental supervisors as safety inspectors. This inspection is usually held between 3 and 4 o'clock on Wednesday afternoon. A copy of the inspection committee's recommendations for correcting hazardous conditions in the plant is submitted to the plant superintendent who in turn issues a memorandum to the department heads involved and to the chief maintenance mechanic for correction.

Accident Reports: Another phase of our safety program was to institute the use of a foreman's accident report. This form was issued to all department heads in the plant. In the event that an accident occurred, it is filled out completely by the supervisor, and submitted to the plant superintendent for review and discussion with the department head as well as the injured person.

Knowledge of any injury as soon as it occurs is an extremely important aspect of any safety program. If the accident is reported immediately, all facts can be obtained exactly as they happened with no time lapse to forget or overlook important details.

The use of this report has enabled us to delve into the facts almost immediately after an injury occurs. In this way, we find that many minor injuries can be treated as first aid cases by a trained girl in the plant without the necessity of involving a doctor, thus preventing many of them from developing into a serious case.

Training: The next phase of our program was to centralize the hiring and training of all employees. Hiring was assigned to the plant superintendent and training to the department supervisors. In doing this, we can be assured that every

effort to control safety in the minds of new personnel will be made.

After new employees are selected and assigned to a specific job, a 15 minute safety talk is given by the superintendent to the group of new people. During this talk, they are informed to report malfunctioning equipment to their supervisor immediately. They are cautioned against using equipment with which they are not familiar or which they have not been specifically trained to use.

They are also instructed that under no conditions are they to interfere with another operator while a machine is in use. This could very easily lead to an unnecessary injury, resulting in loss of time and earnings.

Also, the seriousness of some previous injuries are discussed with new employees in order to impress them with the importance of safety and what could result if poor work habits are developed.

They are instructed to listen attentively to the supervisor training them, and to ask questions regarding the safety aspects of the machines to which they are assigned.

During the safety talk, if any of them had ever been injured on other jobs they are asked to describe their injury and how it happened. After this is done, the superintendent interprets the facts and tries to show them how the injury might have been prevented.

When the operators are assigned to the department the supervisors are instructed to stress safety during the critical first four weeks of training. We feel that this serves as a constant reminder to all new operators and instills safety in them from the very beginning of their employment.

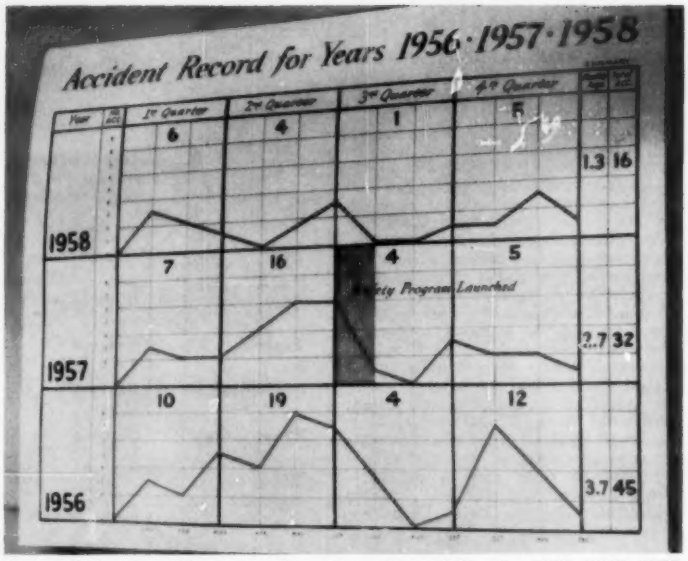


Fig. 9: Photo of accident record as shown by statistics for 1956, 1957, 1958.

With the essential details of the safety program established, we wanted to maintain a safety minded attitude among all supervisors and plant personnel. This we believe we accomplished by having monthly meetings with all department supervisors, in addition to our regular safety committee meetings. At these supervisor safety meetings, we brought all supervisors up to date regarding any injuries which may have occurred during the period. We also arrange to show safety films and discuss all the salient points. (Figure 6)

Our next step was to inject safety consciousness down to the employee level. To accomplish this, we use safety booklets discussing safety and its importance. These booklets are made up in cartoon form and are presented in a very interesting manner. They are distributed to our employees monthly.

To further arouse interest amongst our employees, we adopted a safety slogan campaign. Each month a $5.00 award is presented to one employee in each department who can repeat the slogan verbatim. (Figure 7)

These slogans are submitted to the committee by our supervisors. The committee selects the slogan to be used for the month and the author of the slogan is presented with an award valued at $10.00 at the next supervisors' meeting.

As you can see, in Figure 8, these are simple slogans. We believe that these slogans have played a very significent role in making our supervisors as well as our employees more safety conscious. The interest created by this campaign was more than we had hoped for.

This then is our safety program as we have used it since July of 1957. Since the merits of any program can only be truly evaluated

TABLE 1

Analysis of Accident Record for 1956—1957—1958

MONTH	NO. OF ACCIDENTS 1956	NO. OF ACCIDENTS 1957	NO. OF ACCIDENTS 1958	QUARTERS
Jan.	3	3	3	1st
Feb.	2	2	2	Quarter
Mar.	5	2	1	
Apr.	4	4	0	
May	8	6	1	2nd
June	7	6	3	Quarter
		Launched Safety Program		
July	3	1	0	3rd
Aug	0	0	0	Quarter
Sept.	1	3	1	
Oct.	1	2	1	
Nov.	7	2	3	4th
Dec.	4	1	1	Quarter
TOTALS	45	32	16	
Avg. No. of accidents per month	(3.7)	(2.7)	(1.3)	

by the results it produces, the accident record for 1957 and 1958, as compared with 1956, are shown in Figure 9 and Table 1.

As you can see, the seasonal accident cycle for the year 1956 carried through until June of 1957 when our new program was initiated. However, from July of 1957 through 1958 you can see that the seasonal appearance of the accident cycle has changed considerably and has taken on a pattern of its own quite different from that of the seasonal business fluctuations.

Comparing 1956 to 1958, our first quarter of 1958 shows 6 accidents compared with 10 in 1956, a reduction of 40 percent. It is interesting to note that in all 3 years we had the same number of accidents in January and February. We were finally able to break this pattern in 1959. In January this year we had 2 accidents and in February just 1.

In the critical 3rd quarter handling peak volume, we reduced the number of accidents from 19 in 1956 to 4 in 1958, a reduction of 78 percent. For the first time in the history of our company, we were able to achieve an accident free month, April 1956, in a seasonal peak volume quarter.

The third quarter indicates 3 less accidents compared with 1956. A reduction of 75 percent. The 4th quarter shows 7 less accidents indicating a percentage decrease of 58 percent.

At the right side of the chart in Figure 9 there are two columns: The first column represents the average number of accidents per month. The second column represents the total number of accidents for the year.

In 1956 we had 45 accidents for an average of 3.7 per month. 1957 shows 32 accidents or 2.7 per month; 1958 shows 16 accidents or 1.3 per month.

Needless to say, we are quite pleased with the improvement in our accident record since the launching of our safety program in July of 1957. This serves to prove beyond any doubt what a little effort in the right direction can do to control accidents.

Safety is an ever-continuing thing. We must be eternally vigilant. For example, we are now attempting to adopt professor John Flannagan's "Critical Incident" technique, an attempt to isolate the "Near Misses" which occur in a factory situation. Our supervisors and employees will be asked at our meetings to describe situations in which they were almost involved in an accident.

A. What was the situation?

B. How did it happen?

C. What precautions are necessary?

D. What can be done to avoid it?

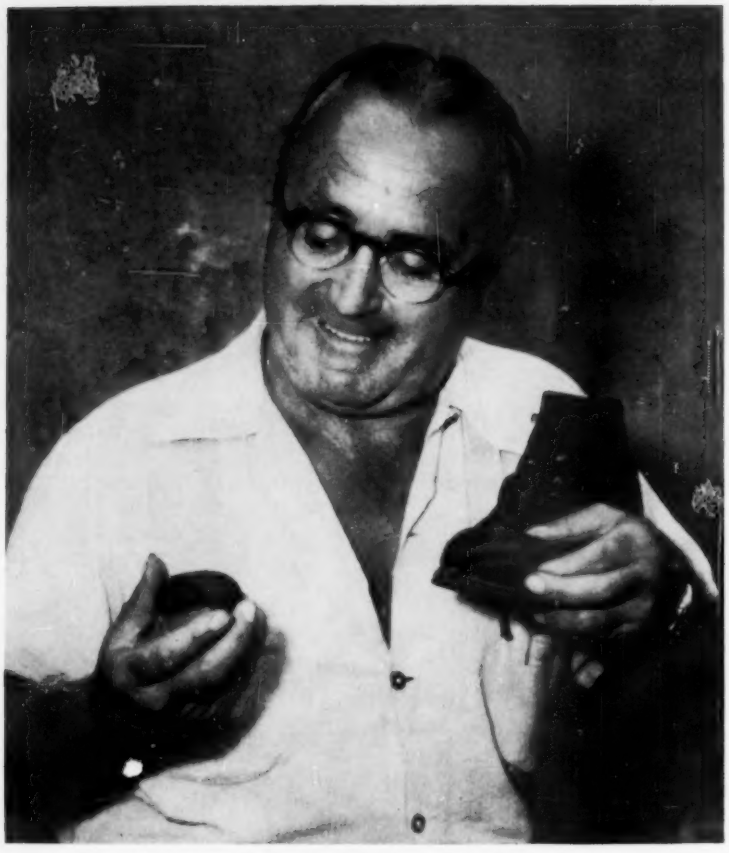
This approach we are contemplating, together with any other techniques, will keep our program alive; ever in front of our people; thereby avoiding the staleness of an accustomed approach.

History need not repeat itself—not where "preventidents" are involved!

From an address presented at the 29th Greater New York Safety Convention.

(For details, use Key # M-7 on Inquiry Card on page 1)

Another Accident Checked



The Shoe With the Safety Toe

If Edward P. Burch of the Brooklyn Army Terminal ever had any doubts about the value of safety clothing, he became convinced when a steel car plate struck his left foot recently.

Burch was working at the terminal as a blocker and shorer on the platform of a building while another employee operating a forklift was unloading cargo from a double-door freight car. As the lift left the car it accidentally dislodged the car plate, causing it to spin around. The swirling plate struck Burch on his left foot. The steel cap of his safety shoe was dislodged, but Burch's only injury was a small laceration on his big toe.

Burch's comment: "I'd like to cover the shoe with gold and set it on the mantel."

Tanning Industry Safety

"The problem of safeguarding mechanical hazards varies from industry to industry. Mechanical exposure is particularly difficult to control in tanneries, and much remains to be done before injury prevention is assured." This is the conclusion drawn as the result of a three year study of serious injuries in the tanning industry recently completed by Employers Mutuals of Wausau, Wis.

The report, entitled, "Serious Injuries in the Tanning Industry," was based on a study made of a broad cross-section of tanneries, according to F. W. Braun, vice president in charge of accident prevention for Employers Mutuals.

Purpose of the study was "to reveal exactly where the tanning industry was being hurt the most by serious injuries and to discover in what areas there is particular need for the development of more effective safety controls." The results of the study underlined the fact that machine accidents are the major safety problem in the tanning industry."

The study centered on tannery injuries involving costs of over $500 each. Sixty-six individual cases were concerned, accounting for total costs of over $200,000. Average cost per case was $3,034. Twenty-four of the cases—or 36.4 percent—were due to machinery or mechanical types of accidents, accounting for 45.5 percent of the total cost. Machine accidents accounted for nearly half of the total cost of the cases studied, and produced over one-quarter of the total cost of all accidents reported by the tanneries in the three years studied, Braun reported.

Of the 17 injuries involving inadequate guarding, 5 were safety code violations. While the other 12 were not code violations, they failed to meet the guarding standards established by the Tanners Council of America and the National Safety Council.

A final analysis was made to determine if there were any significant factors involved in these serious cases such as length of time on the job, work performed or age involved in the machinery accidents. This analysis revealed that:

1) Twenty-five percent of the injured employees had worked for the company less than one year, while 42 percent had been with the company at least ten years.

2) Injuries occurred when 17 percent of the employees were performing maintenance and eight percent were performing jobs other than their regular ones when they were injured.

3) Two employees were over 60 years of age, while one was under 20 years of age.

4) Two of the injured employees were female.

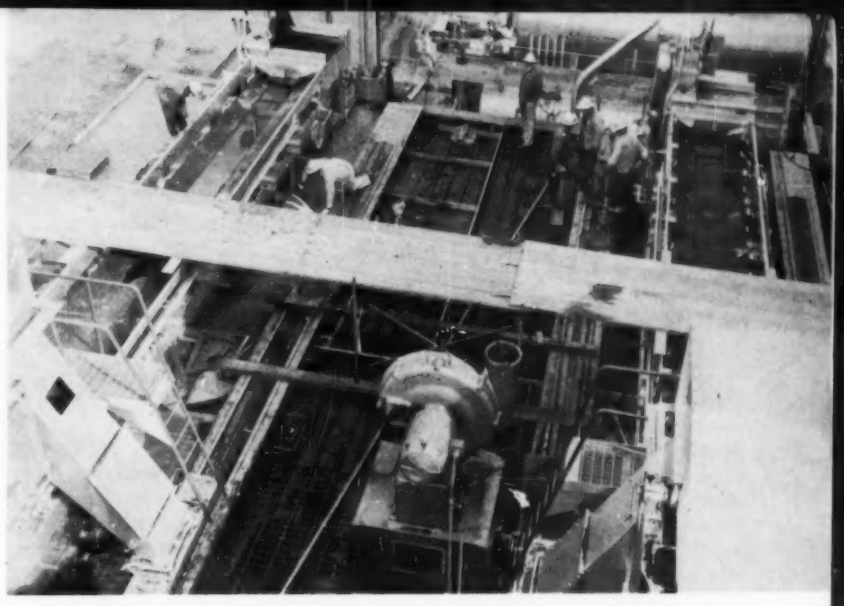
"Accidents of the types previously described don't just happen," stated Braun's report, "they are caused. The results of this study underline the fact that greater effort can—and must—be made by responsible management, supervision and workmen in the tanning industry, toward the more effective control of accidents."

Automatic Snow-Removal

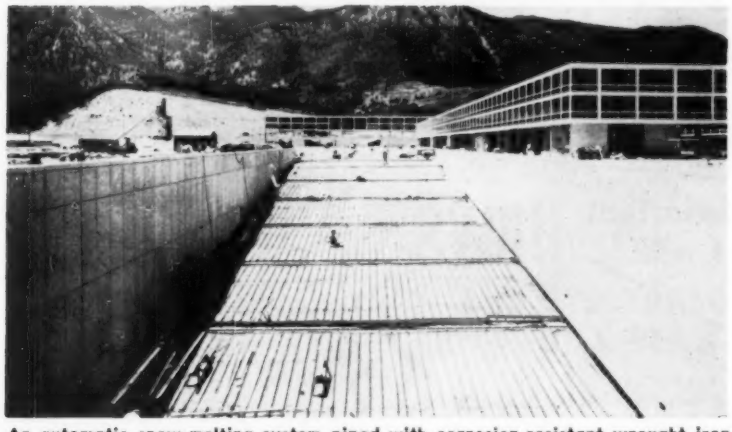
In the generation of electric power in the northern areas, snow and ice can be obstacles to normal operations. To overcome these obstacles, Public Service Company of Colorado has installed an "automatic" wrought iron snow removal system in the No. 1 Unit of its Cherokee Steam Electric Station, near Denver.

Now, with the system in operation, "tripper deck" work flows safely and smoothly for maintenance personnel whose duties require spending a considerable amount of time in what would ordinarily be snow-clogged areas. Also, deck heat prevents snow and ice from building up on low, moving parts of operating equipment.

Located over coal bunkers, the tripper deck provides space for conveyor equipment used to distribute coal to storage bins, and into the stokers. One-inch diameter wrought iron pipe, which has a coefficient of expansion similar to concrete and is resistant to corrosion, was coiled on 11-inch centers and embedded in 5¾-inches of concrete. Hot water, mixed with anti-freeze and heated by a steam exchanger, is circulated through the piping system. Designed to operate at a minimum temperature of 180 degrees Fahrenheit, the snow melting area measures 24 feet by 50 feet. A wrought iron pipe radiant heating system was also installed in the first floor of the station's office building.



In this picture work is going forward on the installation of an automatic snow-melting system on the tripper deck of an electric generating plant in Colorado.

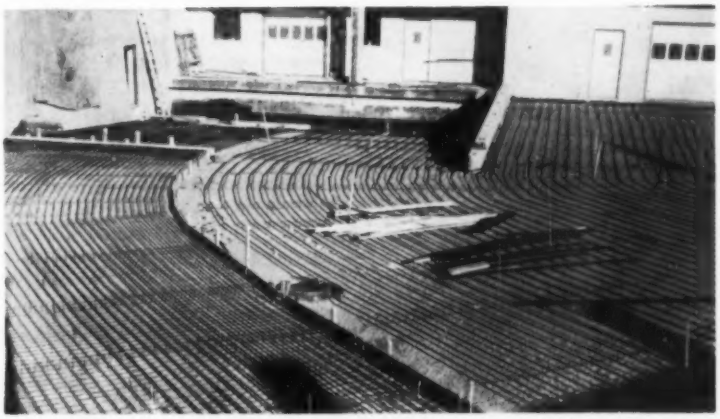


An automatic snow-melting system piped with corrosion-resistant wrought iron grids was installed in this 5,000 square foot ramp at the Air Force Academy.

Service cars and trucks of the Minnesota Highway Department have easier wintertime access to and from the new $8 million State Highway Building because of a similar snow melting system. It is designed to assure dry pavement even in the worst weather for vehicles moving in and out of this loading dock area.

An etheylene-glycol solution circulates through this ¾-inch diameter pipe. The wrought iron pipe which resists corrosion also was used in the building's soil, vent and waste lines, and downspouts. The snow melting system covers a 16,000 square-foot area.

(Continued on the next page)



Wrought iron pipe coils before being imbedded in concrete in the loading dock area of Minnesota Highway Dept. building. Pipes are part of melting system.

Snow and ice may keep aircraft grounded, but future officers at the new Air Force Academy at Colorado Springs, Colo. won't find the same wintry obstacles hindering their ground training. An automatic snow melting system has been installed on a sloping ramp leading from the academic area to the parade ground of the $135 million institution.

The clear, dry pavement is expected to reduce slip and fall hazards during winter months—a lengthy period in this 8,000-foot high Rocky Mountain foothills area. As a result, this nation's future airmen will be counting cadence on safe, solid pavement that could have been, without proper planning, a dangerous walkway.

The wrought iron piping was positioned 1½ inches below surface of the 7-inch thick concrete ramp slab. Before concrete was poured, the grid layout was hydrostatically tested at 200 pounds pressure for 24 hours.

A 44 percent ethylene glycol and water solution is heated to 135 degrees Fahrenheit in a heat exchanger. A vertical split case pump circulates this mixture through the automatic snow melting system at 1,400 gallons per minute.

Pictures by courtesy of A. M. Byers Co.

ISM Plans for 1960 Activities

The Institute of Sanitation Management held its most successful annual Conference and Show in New York City this fall, according to an ISM announcement. The total attendance at the three-day event of some 3,300 marked a high-point in the young association's development as the national organization for sanitation maintenance administrators.

The Sanitation Maintenance Conference and Show consisted of 10 separate program sessions of the Conference, featuring 62 member and guest speakers, and three exhibit sessions of the Show, with 63 exhibitors displaying products and services in 77 booths.

Topics on the program covered the entire spectrum of sanitation maintenance in all types of industrial, commercial and institutional operations. Following established Institute patterns, the meetings consisted of two general program sessions for discussion of universal sanitation subjects, two combined sessions divided into food processing and non-food manufacturing and building operations, and six separate sessions to discuss the specific problems of the operations represented by ISM Divisions: Buildings, Consultants, Food Processing, Industrial, Institutions, and Mill and Bakery.

Among the high-level papers and talks delivered to the Conference were two original research reports on cleaning and custodial operations in office buildings and schools. The office building survey was explained by Richard F. Ehmann, and the school study by Albert J. Burner, both of the Central Maintenance Division of the Port of New York Authority.

The tone of the meeting was well set by the two keynote speakers at the opening session. Mr. Edward P. Field, Vice President of Colgate-Palmolive Company, emphasized the economic need for better industrial and institutional sanitation and challenged the sanitation administrators to do a better job through the Institute of selling their function to management and advertising it to the world.

Edward A. Dubois, Supervisor of Sanitation and Security for Polaroid Corporation, Cambridge, Mass., followed with specific recommendations on the application of management principles to sanitation maintenance. Basing his arguments on the use of industrial engineering methods, he urged that the sanitation field define its standards and relate them to the economics of business, institutions, and public agencies, as the safety field has defined its goals and expressed them in economic terms.

The Industrial engineering methods urged for sanitation, he said,

(Continued on page 32)

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Eye and face hazards are inevitable in industry . . . so take positive steps to reduce the extent of injury and minimize insurance claims. HAWS Emergency Eye and Face Wash Fountains flood contaminated areas with water – instantly ridding face and eyes of caustics, chemicals and dangerous particles. This instant relief may well prevent permanent damage – bridging the gap until medical aid arrives. Install extra safety – HAWS Emergency Fountains and Drench Showers.
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Model 8933:
Face spray ring acts simultaneously with eye-wash, sending controlled streams of water from specially designed twin fountain heads.
(For details, use Key # M-8 on Inquiry Card on page 1)

Edited by HENRY M. GROSMAN
Counselor at Law, Newark, N. J.

MEMBER . . . . . .
Master Superior Court, New Jersey American Bar Ass'n, New Jersey Bar Ass'n, Chairman, Committee on Workmen's Compensation, New Jersey Bar Association National Federation Insurance Counsel Past Commander, American Legion, Post 10, ... Newark, N. J.

STATUTE CONSTRUED—2nd Injury to Hand—Partial Permanent Disability

Claimant injured hand in 1931 and received compensation for partial permanent disability. He learned to use injured hand so that efficiency was not impaired. In that accident he sustained loss of thumb and first two fingers of left hand. Subsequently he suffered another accident and lost the remaining two fingers of the left hand. He received an award for 100 percent of the left hand without deduction of compensation paid for the original injury. Reversed. Court held it would not be just to charge the employer, who had paid disability for the original accident, with an award for 100 percent of the left hand, for the second accident without deducting from that award the compensation paid for permanent disability following the original injury.

Nelson v. Meeker Foundry; N. J. Supreme Court No. A 97, June 17, 1959.

CAUSAL CONNECTION—Back Injury—Re-Opened Claim

A re-opened claim properly resulted in a finding of no further causally related disability since the medical testimony did not establish a causal connection. The claimant suffered a back injury in 1952, was properly compensated, but continued to see various doctors after he had returned to work. In 1955 a doctor reported that on the basis of the history given him the claimant's condition was due to the 1952 accident, and so the claim was reopened. However, this doctor testified at the hearing that he could not see how the injury described to him could have caused the present condition and that it was impossible for him to say that there was a causal connection. This was the only medical testimony in the record, and the court could not say that the board had resolved the question of fact incorrectly. Affirmed.

Phillip vs. C. & M. Auto Spring Co.; New York Supreme Court, Appellate Division, 3rd Judicial Dept. No. 1493. August 13, 1959.

REDUCTION OF PENSION to Extent of Workmen's Compensation—Contract Agreement Construed—Validity

The lower court properly ruled that a provision of the employer's private pension plan reducing the amount of a pension payable (to the extent of any benefits under the workmen's compensation law received by the pensioner after retirement) was not invalid as against public policy. A provision of the pension plan provided that any disability payment, in the nature of a pension under any state law, shall be deducted from or charged against the amount of any pension payable under the pension plan agreement. The employee received his pension from April 1, 1955 until November 30, 1955. On September 30, 1955, the pensioner was awarded temporary and permanent disability compensation. The court endorsed the employer's position that it was not required to resume payment of the pension until January 1st, 1961, by which date the total of monthly pensions (computed from April 1st, 1955), would equal the disability compensation awarded. The Court held that the pension plan provision was not against public policy but was a committment by the company to see that each retired employee received a fixed amount of money monthly to partially compensate for wages lost through inability to continue employment by reason of age. The scheme had no particular relation to compensation benefits. Since the agreement was collectively bargained for, the rights and obligations of the parties had to be measured by the terms of the contract under the ordinary rules of contractual construction. Affirmed.

Renshaw vs. United States Pipe & Foundry Co.; New Jersey Supreme Court. No. A-93. July 31, 1959.

CAUSAL CONNECTION—Heart Condition—Strain and Exertion

The board erred in finding that the claimant was entitled to compensation because he did not meet the burden of showing an accident from overexertion. The claimant, an auxiliary engineer, did heavy work only during an 8 day period in each year when his employer overhauled six engines at his plant. On the last day of this 8 day period, while checking bolts with an air wrench weighing between 35 and

40 pounds, held chest high, the claimant felt a sharp pain across his chest. He was subsequently admitted to a hospital with coronary trouble. This work was not new because the claimant had made this overhaul operation his regular work for 4 consecutive years. The claimant admitted that at the time he felt pain he was using the wrench the same way he always used it. The court held that disability resulting from the doing of an occasional act involving sustained muscular effort will not constitute an accident if the work is of the same kind and quantity and done in the same manner as it has been performed in the past. The claimant's medical testimony, which in effect stated that there was a strong possibility that the claimant was having coronary attacks and that the spell could have been induced by overexertion and the conclusion that it probably was, was insufficient to establish his disability from the accident. Affirmed.

Bonaduce vs. Transcontinental Gas Pipe Line Corp.; Pennsylvania Superior Court. No. 169. September 16, 1959.

CAUSAL CONNECTION—Head Injury and Heart Attack—Pre-Existing Condition

The widow of a deceased employee was properly denied compensation since there was no causal connection between decedent's employment and death. Decedent's death resulted from a coronary thrombosis. Early on the day of the fatal attack, decedent struck his head on a door while working. He sustained a small cut over his eye for which he received first aid treatment. The attack occurred that evening, and death resulted 16 days later. Medical testimony demonstrated that there was no connection between the slight head injury and the heart attack, and so there was no causal connection between the employment and death. Affirmed.

Batemarco vs. The New York Times Co.; New York Supreme Court, Appellate Div., 3rd Judicial Department No. 1472. August 13th, 1959.

ISM Activity Plans

(from page 30)

were based on the following familiar principles:

1. Eliminate labor which can be eliminated.

2. Divide and assign labor among employees in such a way that the most valuable skills are developed in the employees who are best able to acquire them.

3. Standardize work routines and measure results exactly.

4. Relate pay directly or indirectly to achievement.

In stressing the economic aspects of sanitation, Mr. Dubois said: "I hope that we shall soon be able to develop facts about the dollars invested in buildings and mechanized sanitation equipment expressed as a function of the square feet we maintain or of the number of men on our payroll. In so doing, we may not immediately get the additional capital investment we need to improve our methods, but we shall demonstrate that we are thinking of our sanitation program in the same terms as management."

Mr. Dubois is also President of the Greater Boston Chapter of the Institute.

A similar note was struck in the speech of outgoing ISM President Edwin S. Doyle of National Canners Association, Berkeley, Cal. Mr. Doyle stressed that the Institute is "pioneering in our field and no one has the answers, or even very many of them—we must move forward and not become self-satisfied.

"We must realize that we cannot retire into a professional status we may declare for ourselves; it is a continuing challenge and a path to a more rewarding future if we accept the challenge and prove our worth. And above all, we must remember that professionalism is a challenge—not a protective device."

Among the plans laid by ISM for its 1960 operations was the next annual Sanitation Maintenance Conference and Show, to be held in Detroit, Mich., October 25–28 in the Sheraton-Cadillac Hotel.

Actions were taken by the Institute's Board of Directors to strengthen the value of its Western Regional Conference to its western members. The 1960 Western Regional Conference will be held in the Spring in San Francisco.

Two new local chapters were also planned for 1960, in Pittsburgh and Atlanta. During 1959, new chapters were started in Cleveland and Boston and initial work in other cities. The Institute now has 12 local chapters across the country.

Publication of an authoritative text on industrial and institutional sanitation came closer to realization during the New York meeting. Under the chairmanship of past president J. Lloyd Barron of National Biscuit Company, the Institute's publications committee developed the basic subject and chapter outline and is moving rapidly ahead on writing tasks. The publication, when available, will be the first complete book on industrial and institutional sanitation, ISM declared.

Further information about the Institute or its programs may be obtained from its headquarters office at 101 West 30th Street, New York 1, N. Y.

Results of Vehicle Safety-Check Program

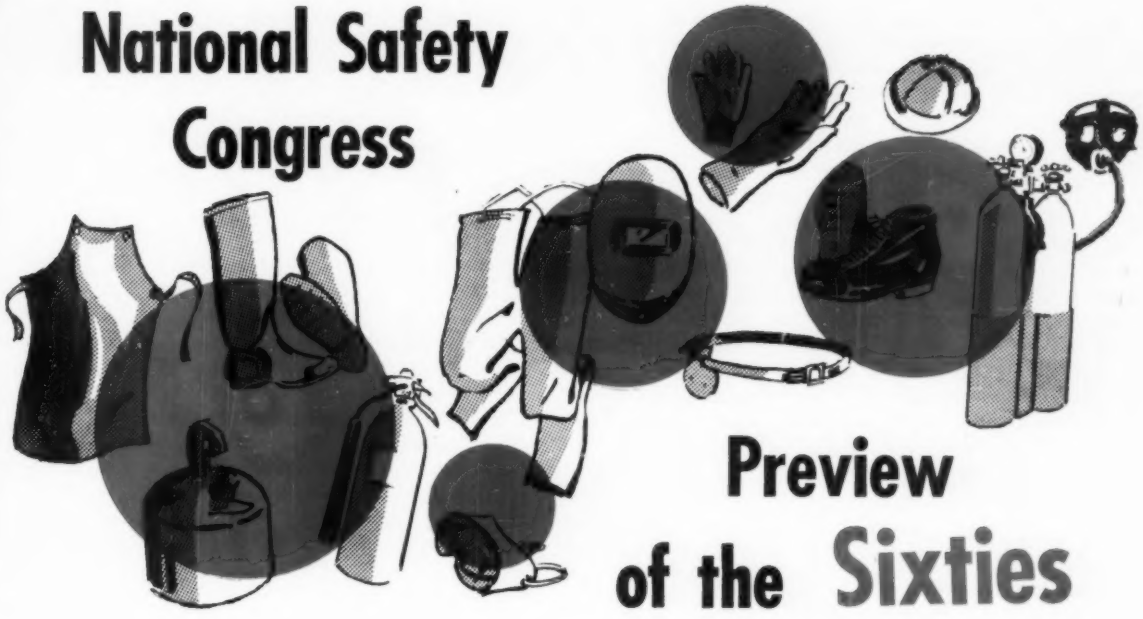
Results of the 1959 National Vehicle Safety-Check program show, for the fifth consecutive year, **one out of every five vehicles** to be in need of maintenance attention for safe driving condition. An all-time high of 3,096,630 vehicles were reported Safety-Checked during the program this year at community check lanes, dealer service departments, and by industrial plants, government agencies, and military installations.

"For the fifth year in a row, rear lights were most often found to be in need of service attention," said Charles C. Freed, Chairman of the Inter-Industry Highway Safety Committee. "Next in order of items most frequently found in unsafe condition were front lights, brakes, exhaust systems, and tires," he continued. "This is the first time since 1954 that front lights have had a greater incidence of unsafe condition than brakes," he added.

In congratulating the more than 3 million motorists who cooperated

(Continued on page 42)

National Safety Congress



Preview of the Sixties

Safety In the Sixties was the forward-looking theme of the 47th National Safety Congress held in Chicago during the week of October 19–23. Representatives from all over the United States and from foreign countries as well listened attentively to leading safety authorities who discussed a wide variety of accident prevention, fire protection, health conservation and sanitation problems in the fields of industry, transportation, commerce, schools, agriculture and the home.

Safety on Display

Between the various session periods, numbering over 300, the delegates to the conference had opportunities to preview the latest developments in safety, fire and health equipment at the safety exhibition. At the many booths of safety equipment manufactureres and suppliers, safety service organizations, and safety publishers, viewers could examine new types of protective clothing and shoes, fire extinguishers and fire alarms, safety cans, signs and bulletin boards, safety magazines for the engineer and pamphlets for the employee, first aid kits and resuscitation devices, machine guards and safety devices, ladders, floor machines, lens cleaning equipment, noise analyzers and hearing protection devices, etc.—a vast display of products to prevent costly accidents and to protect personnel from injuries.

At the banquet for the delegates to the 47th National Safety Congress, the principal speaker was E. J. Thomas, chairman of the board, Goodyear Tire & Rubber Co., Akron, Ohio, who stated that the nation's lack of concern for safety could be a greater danger than the Soviet threat. As a guest at a dinner given Soviet Premier Khrushchev on his recent visit to America, Thomas said he was struck by the thought that Khrushchev "possibly represented a great potential threat to our safety as a nation. And, still, I could not help thinking that our relative disregard for personal safety has been—in some respects—an even greater danger than Khrushchev and what he represents."

"Since the beginning of the Cold War," the speaker said, "more lives have been lost, more bodies mutilated and more property destroyed by the aggression of accidents than by the aggression of wars of communism—and that includes Korea."

The Goodyear executive then turned to industry's attempts to assure the safety of workers.

"An industrial safety program," he said, "must enjoy the complete support of top management—not only as a humanitarian measure and a moral obligation, but as a good business proposition as well—if it is to succeed."

Equally important, Thomas said, is the direction of such a safety program by a safety engineer or expert, "for this area is entirely too big and complex for anyone except a safety expert."

"I believe," he continued, "that industry's job is not really done until the worker realizes that safety is not confined to his shift. Safety does not begin or end when a time card is punched. That kind of worker is only half safe.

"While we are trying to create greater in-plant safety, we cannot overlook the fact that the most dangerous part of a man's job today is probably the trip he makes to and from his place of employment."

To help make that trip safer—as well as to make the highways safer for all motorists—Thomas recommended a four-point program calling for: 1. Realistic and uniform laws enforced with swift and sure penalties; 2. Periodic and compulsory vehicle inspection to reduce the number of unsafe cars on the road; 3. A strengthened direct safety appeal to drivers through local and national advertising in newspapers and maga-

zines, and on radio and television; 4. The posting of markers—plainly identified for what they are—at the scene of traffic deaths which would be a danger warning as recognizable as the "whirring of a diamondback rattler."

"Who could pass a marker such as this," Thomas asked, "without perhaps easing his foot on the accelerator, without becoming a little more alert and concentrating a little more on the road? Perhaps the time has come to set up throughout the nation a grim reminder of what progress has wrought."

Following are highlights from some of the other speeches presented at the various sessions of the Congress during the week.

Fire Protection

A fire safety man stirred up embers of the tragic fire that claimed 90 victims at Our Lady of the Angels parochial school. He did so in revealing what he called "the answer to realistic fire protection" of schools: "an approved, engineered automatic sprinkler system."

Dale K. Auck, director, fire prevention division, Federation of Mutual Fire Insurance Companies, Chicago, and a member of the coroner's jury that studied the school fire—reportedly the third worst in history—said his assertion was based on a series of tests conducted in Los Angeles.

"The coroner's jury," Auck recalled, "determined that the contributing factors in the Chicago fire were poor housekeeping, ancient wiring, burnable buildings and contents, unrealistic fire drills, no planned emergency evacuation procedures."

The jury made 31 recommendations, which, he said, "have gone to the four corners of the world—and now civic apathy has started to set in."

But not in Los Angeles, according to Auck. "That was one place where apathy didn't get a foothold. They got busy. The board of education was going to tear down a school to build a new one. They gave it to the fire department to be a guinea pig."

The more than 75 fires set in the building turned up this fact: "The answer to realistic fire protection, especially to existing buildings, is a total coverage of a combustible building with an approved, engineered automatic sprinkler system."

You can't tell a book by its cover. And neither can you spot a faulty fire extinguisher just by looking at it.

"There is a tendency," said Jack Stroube, assistant manager, employee activities and safety, R. R. Donnelley & Sons Co., Chicago, "to assume that the fire-fighting equipment once in a plant will always operate, and that it is still ready to use just because it hasn't been used.

"Unlike most safety equipment, fire-fighting tools are not constantly in use. Time, dirt and unnoticed physical damage can take its toll. Merely looking to see that the equipment is still there is not enough."

Weed killer, whisky, fireworks and dry goods are a poor combination—when stowed in the same compartment of a ship, that is, as was pointed out by Capt. Harry J. Parker, chief surveyor, National Cargo Bureau, New York City. The bureau was organized in 1952 at the suggestion of the U. S. Coast Guard, the government agency charged with administering the Dangerous Cargo Act. The bureau gives advice on the safe and proper stowage of cargo.

Capt. Parker cited the unusual combination of goods as an example of dangerous stowage. It resulted in a fire and several explosions, because this combination of commodities was extremely dangerous.

Accident Costs

Accidents are costing the American people more than three times as much as foreign aid, a safety man pointed out at the congress.

"But we kick up a king-size commotion over foreign aid and maintain a remarkable calm toward accidents," according to Paul Jones, director of public information for the National Safety Council.

"The total appropriation for foreign aid and military assistance in our national budget this year," said Jones, "is about $3.3 billion.

"But have you and your family, your friends or your business associates had even a mild discussion lately over our curious habit of pouring almost 12 billion dollars a year down the accident rathole?

"Think of it—12 billion dollars a year in insurance premiums, loss of wages, medical and hospital bills and property damage!"

One of the biggest obstacles facing accident prevention, said Jones, is that safety is taken for granted. "More than that, too often it is expected for free.

"Unfortunately, it just can't be free. For while it is true that the cost of preventing accidents is only a fraction of the cost of having them, it is also true that you have to pay something for safety. And, like anything else, you get what you pay for. Bargain basement safety is not the answer to the accident problem!

"Industry has been aware of this for some time, and the results are apparent. A worker is twice as safe on the job today as he is off the job."

A safety and training consultant gave a group of safety men some inside facts on the cost of accidents. Alfred Lateiner, of Mamaroneck, N. Y., noted, "It has long been said that for every dollar spent on the direct cost of injuries, $4 is spent on indirect costs. The four-to-one ratio is just the beginning.

"The ratio, applied only to accidents that result in injury, is a grave underestimation. A 40-to-one ratio is more accurate! The accident problem is like an iceberg," Lateiner declared. "Just a fraction of its bulk is visible."

Another speaker who emphasized the astronomical cost of accidents was H. M. Jackson, manager of the industrial health program of Johns-Manville Corp., New York City.

Though the firm lowered its disabling injury frequency during the last eight years, according to Jackson, "our out-of-pocket costs for workmen's compensation and medical benefits have risen from $235,000 to $725,000.

"On the basis of our 1958 earnings," he told delegates, "it took about $10,400,000 worth of sales to pay for this nonproductive, out-of-pocket expense."

(Continued on page 50)

Diethylenetriamine Data Sheet

Safe handling procedures for diethylenetriamine are described in a new chemical safety data sheet published by the Manufacturing Chemists' Association.

Diethylenetriamine, a yellow liquid smelling strongly of ammonia, may cause burns to the skin or eyes and repeated inhalation of the vapors may result in an asthmatic type response. It is used as an intermediate in the preparation of textile, paper and agricultural chemicals, in coatings and adhesives, in the polymerization and vulcanization of natural and synthetic rubber and in numerous other applications.

MCA's new safety data sheet covers the properties, hazards, employee safety, handling and storage, tank cleaning, waste disposal, medical management and first aid. Copies of SD-76, Diethylenetriamine are available at 30 cents each from the Manufacturing Chemists' Association, Inc., 1825 Connecticut Avenue, N. W., Washington 9, D. C.

Value of Visiting Nurse Service

Absenteeism because of illness has dropped about 12 percent in the last year among the 12,000 employees of the B. F. Goodrich Company at Akron, Ohio. The reason is a visiting nurse service started by the firm late in 1958, according to Dr. Rex H. Wilson, the company's medical director.

Dr. Wilson said the visiting nurse service had proved to be "good business" and had won enthusiastic support from both employees and management. Any employee who is absent from work more than two days because of illness gets a visit from a company nurse. But the system has netted more than mere dollar benefits, the doctor reported.

"The greatest value of the service is that it increases the employees' respect for their company because of the interest shown in them by the company nurse."

Besides the nurses who call on ailing employees at their homes, B. F. Goodrich has one nurse who makes calls on employees, retirees and dependents when they are admitted to an Akron area hospital, Dr. Wilson said.

"She gives encouragement to a frightened, sick and maybe lonely person away from home. She helps relieve financial worries by telling what hospitalization benefits will do. She explains that the cost of x-ray examinations, laboratory tests, the anesthetist and the surgeon will be mostly covered by company-paid insurance.

"Often our nurses make arrangements to get an ailing employee his pay. They also keep well informed on the United Fund agencies and know when the Cancer Society, the Heart Association or the Rehabilitation Center can be of assistance."

Dr. Wilson said the visiting nurses sometimes encounter emergency situations. Often they find patients who think they have a cold or minor ailment when they are seriously ill and need a physician.

Hygiene Guides

The Hygienic Guides Committee of the American Industrial Hygiene Association announces the release of six new guides covering Propylene Oxide, Tetrahydrofuran, Polonium ^{210}, Radon and its Daughters, Selenium and Titanium. These guides, added to the seventy-four previously published, bring to American Technology a mass of authoritative information pertinent to health hazard evaluation, ranging from Acetaldehyde to Zirconium.

The 80 guides provide concise, practical and useful information. An example of the information made available is excerpted herewith: "Selenium—Medical supervision of the workers should be based on general health.[7] Urinary evaluations are also helpful. These may be performed spectrophotometrically.[6] Normal urine values of unexposed males [15] have been given as ranging from 0–15 micrograms per 100 ml, with an average of 4–5 micrograms per 100 ml."

The Guides are priced at 25¢ each with a discount of 20% for five or more. A specially designed dark blue binder is available at $1.25. A list of the 80 subjects may be obtained by writing to the Association at this address: 14125 Prevost, Detroit 27, Mich.

Fig. 1: Local exhaust ventilation serves plate polishers.

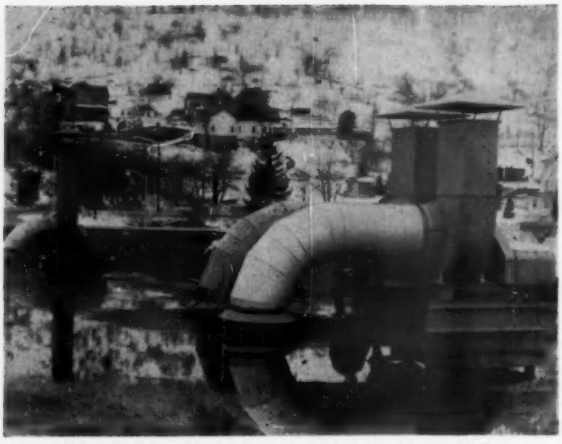


Fig. 2: Polyvinyl vent ducts can withstand the acid fumes.

FIVE DUST & FUME PROBLEMS

1. Fine Gray Iron Dust

Welbilt Corp., Detroit, Mich., manufacturer of commercial and residential ranges, performs considerable cleaning, grinding, and polishing on gray iron stove components. Included in the cleaning and finishing room are two blast cleaning machines, four double-stand grinders, two double-stand snag grinders, a disc grinder, and three plate polishers. The polishers are shown in Figure 1.

All of these operations produce dust, which can be very bothersome, if uncontrolled. Gray iron, of course, has much free graphite in the metal. As a result, working it makes quite small particles of dust. These small graphite and metallic particles are dispersed very easily if uncontrolled, making their effect felt over considerable areas.

This company solved that problem by using local exhaust ventilation. Hoods at the dust producing points of this machinery corral the dust before it escapes. Duct work carries it to a collector where it is trapped, for disposal. Due to the particle size of the dust, two cloth-filter type collectors were selected. They are situated on the plant roof to save valuable plant space. One ventilates one blast cleaning machine; the other ventilates the other 11 pieces of equipment. Dust is no longer a problem for the company.

2. Corrosive Acid Fumes

Venting corrosive acid fumes that develop during cigarette lighter plating operations may no longer be a problem for Zippo Manufacturing Company, Bradford, Pa. The answer appears to be PVC (polyvinyl chloride), a thermoplastic material that is immune to galvanic and electrolytic attack.

Acids—chromic, sulphuric and hydrofluoric—are used extensively in final processing of these lighters. Each lighter case is bathed in all three acid solutions. Metal duct work was utilized to fabricate a vent system when the company moved into new plant facilities in 1955. All duct work was coated heavily with corrosion resistant paint, and was designed to remove acid fumes from immediately above each acid plating tank. This metal duct work failed after only 3½ years of service.

A completely new system of ducts utilizing 1,500 pounds of Type I PVC sheet was installed. The sheets were cut, formed, heat welded and erected as vent ducts which are supplemented by three blowers (See Fig. 2). This system maintains a more than adequate amount of fresh air in the plant's plating area. The PVC sheets in thicknesses of $\frac{1}{8}$ to $\frac{3}{16}$-inch were used to form the ducts, which range from 11 to 29 inches in diameter.

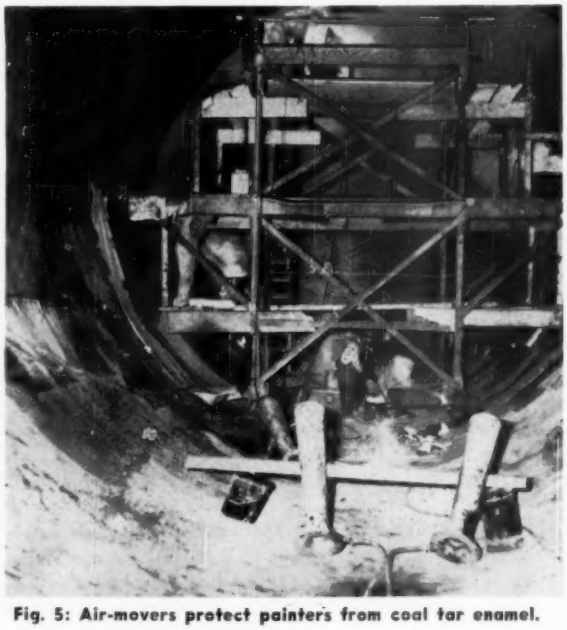


Fig. 5: Air-movers protect painters from coal tar enamel.

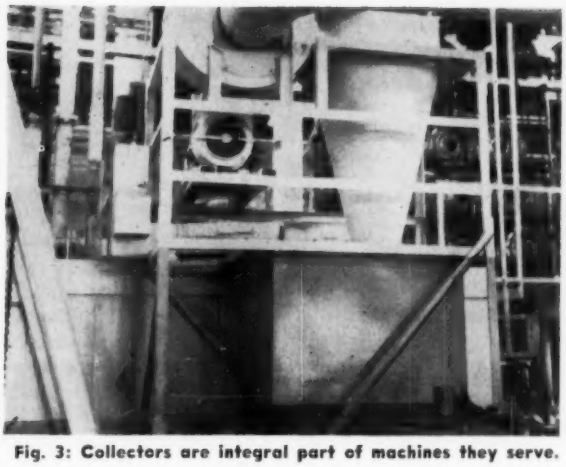


Fig. 3: Collectors are integral part of machines they serve.

Fig. 4: Machine hoods solve problem of big sawdust volume.

AND HOW THEY WERE SOLVED

3. Dust System for Movable Machines

The picture in Figure 3 shows only one grinding machine with a dust collector system behind and above it, but it's indicative of the over-all job recently completed for a large manufacturer of automotive parts.

Flexibility is a must in a plant of this nature. The problem was to replace an ineffectual, outmoded collection system with one that would fit the needs of a factory that was involved each year in production line change-overs.

Collectors specifically designed to handle each group of machines—grinding, polishing, buffing, woodworking—were installed overhead, both to conserve floor space and to facilitate emptying. Tote trucks can be backed in at any time to take the collected dust from the storage hoppers. But most important is the fact that each collector is an integral part of the units it serves. When the machines and connecting piping are moved, the collector goes with them.

Nearly eighty collectors, ranging in size from 500 to 10,000 CFM, were involved in this installation, some of them for new applications, some to replace bulky, wet-type collectors.

DUST & FUME CONTROL SERIES
other articles in January and February

Fig. 6: Here painter uses air mover to keep vapors at bay.

4. Woodworking Shop in Continuous Operation

Pictured in Figure 4 is the woodworking shop at a United States Air Force Base where twenty-one machines are in almost constant, simultaneous use. Although the original specifications called for a conventional cyclone separator and would have necessitated knocking out the entire end of the building, dust control engineers came up with a plan that more than met the collection requirements without any remodeling at all.

Each of the twenty-one machines has its own collection hood and pipe. These pipes connect with a large main duct located overhead and concealed by a false ceiling.

All the collected air passes through this duct to a large collector which is installed on an elevated supporting frame just outside the shop. When the 100 cubic foot storage hopper is filled, dump trucks back in and sliding gates in the hopper open to discharge the sawdust load.

5. Coal Tar Fumes in Tunnel Maintenance

Practical safety engineering involving the use of portable air movers permitted Industrial Painters and Sand Blasters of Little Rock, Arkansas, to handle

economically a tough assignment for the U. S. Army Corps of Engineers. The firm had a sub-contract to paint the power conduit, penstocks, surge tank and spiral cases of the Corps of Engineers Blakely Mountain Power Plant near Hot Springs, Arkansas.

The company ran into two major ventilation problems—in painting the exterior of the 690-foot steel conduit which was located inside of a concrete tunnel and in applying hot coal tar to the interior of the conduit. In both instances, air movers were brought in and enabled painters to work without fear of toxic or explosive vapors.

How Air Movers Work

The principle of the air mover is that of a venturi. Compressed air is fed to the mover and due to the turbulence of its discharge through the orifice, additional air is sucked through the bell of the unit. The ratio of air sucked through to that actually injected under pressure is about 10 to 1.

In the six-inch model used here, when 293 cubic feet of air a minute (CFM) were injected at 70 pounds pressure, there was a discharge of 3,150 CFM or an induced air flow of 2,857 CFM.

The conduit was 24 feet in diameter and the tunnel only 30 feet in diameter. That left three feet of working room on each side. To complicate the job, the tunnel was dead end upstream. Therefore, there was no flow of natural air.

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The thin gap between the conduit and the tunnel made fans of no value. Yet great quantities of air had to be brought in to combat the toxic and explosive "green smoke" of the thinner used in the base coat paint.

The problem was solved by the use of five air movers.

Catwalks on either side of and parallel to the steel conduit ran the length of the tunnel. This made it possible to spread tarpaulins on the catwalks and divide the tunnel into two equal air spaces.

While the top side of the conduit was being painted, two air movers were placed in the lower section of the tunnel and forced air toward the dead end of the tunnel. Three air movers were placed in the top section of the tunnel just behind the painters and forced air toward the tunnel's open end.

Air was moved at a rate of 5,714 CFM toward the dead end of the tunnel by the two air movers located in the bottom half of the tunnel and 7,571 CFM toward the open end with the three air movers on top. Most of the air moving to the dead end of the tunnel was fresh air.

When the bottom half of the conduit was being painted, the air movers were reversed. Two were placed on top directing air toward the tunnel's dead end and three below with the airstreams pointed toward the open end.

While the painters were working near the dead end, one air mover was placed about midway in the tunnel with its air stream directed toward the open end. This assisted in moving vapor-laden air toward the tunnel's mouth.

The air movers provided adequate ventilation so that only chemical cartridge respirators were required for the painters. The Little Rock firm also discovered that by spotting a three-inch air mover just ahead of the painting crew and directing its air stream directly onto the steel surface of the conduit, moisture from condensation quickly disappeared. This eliminated one of the major problems of tunnel painting.

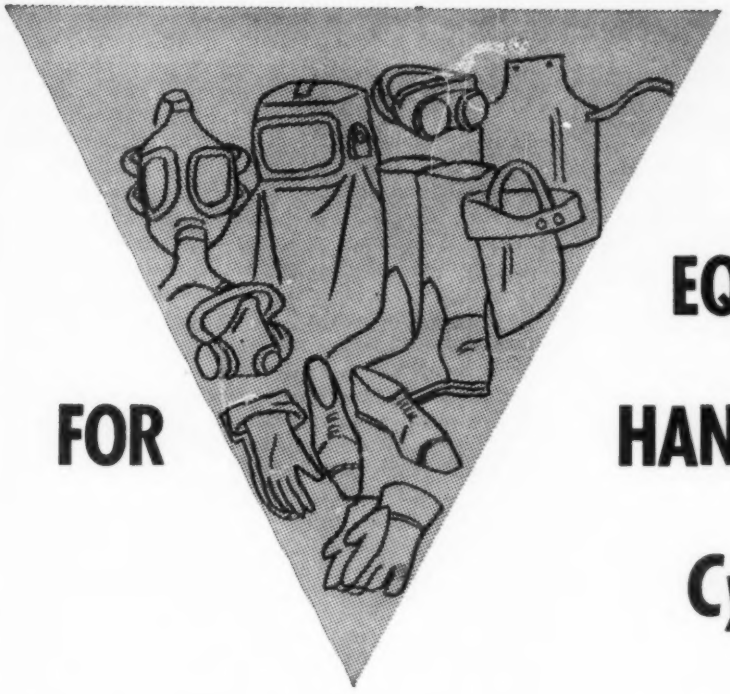
An explosion meter was used regularly to warn against the possible buildup of explosive vapors. But the air movers worked so effectively that constant checks indicated adequate ventilation at all times.

Fume Removal

The compact, easily carried air movers also were called into service when the interior of the steel conduit was coated with coal tar enamel. To keep the heavy coal tar fumes to a minimum, the tar heating kettle was kept near the air vent of the tunnel's surge tank. However, the tar had to be transported to the upstream end of the tunnel to the electrically heated pots on the rolling scaffold where men applied the tar with hand brushes. Coal tar vapors were still a serious problem in the upper end of the tunnel.

To keep the air clear, the contractor opened up vents in the water intake structure on the upstream end of the tunnel and two 60-inch horizontally mounted fans were installed at the top of the surge

(Continued on page 41)



SAFETY EQUIPMENT FOR HANDLING — *Cyclohexane*

While personal protective equipment is not an adequate substitute for good, safe working conditions, adequate ventilation, and intelligent conduct on the part of employees working with cyclohexane, it is, in many instances, the only practical means of protecting the worker, particularly in situations of emergency. One should keep firmly in mind that personal protective equipment protects only the worker wearing it, and other unprotected workers in the area may be exposed to danger.

The correct usage of personal protective equipment requires the education of the worker in proper employment of the equipment available to him. Under conditions which are sufficiently hazardous to require personal protective equipment, its use should be supervised and the type of protective equipment selected should be capable of control over any potential hazard.

Eye Protection

Splash-proof goggles should be worn when handling cyclohexane where leaks, spills or splashes may occur.

Face Shields: Plastic shields (full length, eight inch minimum) with forehead protection may be worn in addition to chemical safety goggles where complete face protection is desirable.

Respiratory Protection

Exposure to cyclohexane may occur in tanks during equipment cleaning and repairs, when decontaminating areas following spills, or in the case of failure of piping equipment. In such instances first consideration should be given to removal of the vapor by ventilation. Employees who may be subject to such exposures should, however, be provided with proper respiratory protection as described below:

> Note: Respiratory protective equipment must be carefully maintained, inspected, cleaned and sterilized at regular intervals, and always before use by another person.

Air-Line Masks supplied by plant compressed air are suitable for use only where conditions will permit safe escape in case of failure of the compressed air supply. Such masks should be used only in conjunction with a suitable reducing or demand-type valve, excess pressure relief valve, and filter. The compressed air should be checked frequently to make certain that harmful gases from the decomposition of the lubricating oil used in the compressor, or impure air supply, are not present.

Positive Pressure Hose Masks supplied by externally lubricated blowers are usually preferred to the air-line type. Since the masks also depend on a remote

The accompanying material is from "Chemical Safety Data Sheet for Cyclohexane" published by the Manufacturing Chemists' Association, Inc. The complete data sheet, in addition to this information on personal protective equipment and fire fighting, outlines the properties, hazards, engineering control, employee safety, handling and storage, tank and equipment cleaning and repairs, waste disposal, medical management, and first aid. Copies of the complete data sheet (SD-68) are available at 30¢ each from: Manufacturing Chemists' Association, Inc., 1825 Connecticut Ave., N.W., Washington 9, D. C.

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air supply, they should be used only where conditions will permit safe escape in the event of air supply failure. Care must be taken to locate the blower air source in an area which is free of air contaminants.

Self-Contained Breathing Apparatus which permits the wearer to carry a supply of oxygen or air compressed in the cylinder, and the self-generating type which produces oxygen chemically, allow for greater mobility. The length of time a self-contained breathing apparatus provides protection varies according to the amount of air or oxygen supply carried. Cylinders of oxygen should not be used in tanks or other confined spaces.

Industrial Canister Type Gas Masks, equipped with full face pieces and approved by the U. S. Bureau of Mines, fitted with the proper canister for absorbing cyclohexane vapor, will afford protection against concentrations of cyclohexane not exceeding 2 percent by volume when used in accordance with the manufacturer's instructions. The oxygen content of the air must not be less than 16 percent by volume. The masks should be used for relatively short exposure periods only. They may not be suitable for use in an emergency since, at that time, the actual vapor concentration is unknown and may be very high. The wearer must be warned to leave the contaminated area immediately on detecting the odor of a harmful vapor; this is an indication that the mask is not functioning properly or that the vapor concentration is too high.

> Note: Where carbon monoxide may be encountered in addition to cyclohexane, the mask should be equipped with an "all purpose canister" and a "timing device" as approved by the U. S. Bureau of Mines.

Chemical Cartridge Respirators may be used to avoid inhaling disagreeable but harmless concentrations of cyclohexane vapor. These respirators, however, are not recommended for protection where toxic quantities may be encountered.

Head Protection

Where there is no danger from falling objects, and safety or "hard" hats are considered unnecessary, soft brimmed hats or caps may be worn for protection against liquid leaks and splashes.

Foot Protection

Leather or rubber safety shoes with built-in steel toe caps are recommended for workers handling drums and cans of cyclohexane. Rubbers may be worn over leather safety shoes. Rubbers and shoes should be thoroughly cleaned and ventilated after contamination.

Body, Skin and Hand Protection

Sustained or intermittent skin contact with liquid cyclohexane may produce dermatitis at the site of

contact. Contaminated areas (except the eyes) should be exposed to copious amounts of running water and washed with soap.

In case of a liquid cyclohexane splash in the eye, even though only mildly irritating, the eye should be immediately irrigated with copious quantities of flowing water.

Although cyclohexane evaporates rapidly, contaminated clothing should be removed and dried away from any source of ignition.

As a general hygienic measure, facilities for personal cleanliness should be provided, and washing before lunch and at the end of the work day should be encouraged.

Fire Fighting

Suitable hand fire extinguishing methods for small cyclohexane fires include carbon dioxide, dry chemical, and foam extinguishers. Low-pressure water spray can be used to control unconfined cyclohexane fires but ordinarily is not effective for complete extinguishment. Extinguishment may be accomplished with high-pressure water "fog." Spray and "fog" are also effective for equipment cooling.

In open tanks and unconfined cyclohexane fires, solid hose streams tend to scatter the liquid and spread the fire, while water spray or high-pressure "fog" cools the burning surface and excludes air to control or extinguish the fire. Automatic sprinkler and deluge systems are important for the protection of facilities and may be used depending on location and exposure. Automatic carbon dioxide, foam or dry chemical systems are also effective for extinguishment for certain types of hazards and processes. The application of the proper type of fire protection methods can be best determined by experienced fire protection personnel.

When fighting cyclohexane fires where carbon monoxide from combustion may be present or where there may be an oxygen deficiency, firemen should be equipped with suitable self-contained breathing apparatus. Properly designed aluminized fire suits will give adequate protection from the radiant heat of a cyclohexane fire.

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Dust & Fume Control

(from page 38)

tank on the downstream end of the tunnel. Three six-inch air movers were kept just behind the rolling scaffold which was moving from the dead to the open end of the tunnel to drive away the vapor from the men applying the coal tar. See Figure 5.

Ventilation usually was good enough so that no respiratory equipment was necessary. Chemical cartridge respirators easily enabled the men to keep working when vapors occasionally increased. The extensive precautions taken during the interior painting of the steel conduit prevented any danger of a fire like those occurrring in similar operations.

Picture credits: Fig. 1—Wheelabrator Corp.; Fig. 2—A. M. Byers Co.; Figs. 3 & 4—Aget Mfg. Co.; Figs. 5 & 6—Mine Safety Appliances Co.

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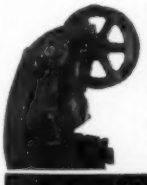

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Vehicle Safety Check

(from page 32)

by having their vehicles Safety-Checked, Mr. Freed added a special word of praise for those who had unsafe items corrected and then returned for a recheck.

"This extra effort to make sure their cars were in safe driving condition demonstrates an acute awareness on the part of these car owners of their responsibility to the rest of the motoring public.

In addition to increased participation by public officials, safety, civic, and business groups, Mr. Freed pointed out the growing participation by industries in providing Vehicle Safety-Checks for Employees. He further stated that since this affords an excellent opportunity to cut down off-the-job accidents, the Inter-Industry Committee would intensify its efforts in the area of employee Safety-Checks next year. The voluntary program is conducted annually during the months of May and June in the 34 states which do not require motor vehicle inspection.

The following statistics indicate the number and condition of vehicles checked during the 1959 Safety-Check in the nationwide campaign.

Of the 3,096,630 vehicles Safety-Checked, 2,819,930 were reported checked in community and special programs. Reports of 1,017,329 vehicles checked were not used in the following tables due to insufficient data submitted.

DEFECTIVE ITEMS	CARS	%	TRUCKS	%	TOTAL	%
Rear Lights	160,537	30.7	16,133	31.0	176,670	30.7
Front Lights	98,440	18.8	8,305	16.0	106,745	18.6
Brakes	91,413	17.5	7,577	14.6	98,990	17.2
Exhaust	45,304	8.6	4,796	9.2	50,100	8.7
Tires	39,517	7.5	2,661	5.1	42,178	7.3
Steering	29,961	5.7	2,760	5.3	32,721	5.7
Windshield Wipers	24,475	4.7	3,033	5.8	27,508	4.7
Glass	17,628	3.4	3,193	6.1	20,821	3.6
Rear View Mirror	5,753	1.1	1,704	3.3	7,457	1.3
Horn	10,721	2.0	1,891	3.6	12,612	2.2
	523,749	100.0%	52,053	100.0%	575,802	100.0%

The breakdown is based on the following reports of vehicles checked and rejected: 1,719,254 cars checked—340,193 rejected; 110,894 trucks checked—27,061 rejected.

(Of these, 212,995 cars and 16,382 trucks were reported corrected and rechecked.)

Construction Injuries

The 1958 work-injury rates for contract construction held close to the low levels established in 1956 and 1957, according to reports compiled by the U. S. Department of Labor's Bureau of Labor Statistics.

The over-all rate of 30.9 disabling injuries per million employee-hours worked in 1958 was not significantly different from the averages of 30.7 for 1957 and 31.2 for 1956. Rates for these 3 years were the lowest recorded by the Bureau since the 1943–45 period, when construction activities were highly restricted. They represent a substantial improvement over the rates which prevailed in the 1946–51 period.

For three of the four subclassifications—general building contractors, highway and street construction, and special trade contractors—1958 injury-frequency rates were essentially the same as in 1957. In heavy construction, other than highway and street, however, there was a rise from 26.6 to 28.5.

Among the limited number of special trades activities for which separate data are available, the frequency rates ranged from 44.8 for roofing and sheet metal work to 21.9 for painting, paperhanging, and decorating.

Injury severity experience for construction in 1958 was similar to that of 1957. Average disability per injury in 1958 was 90 days compared with 95 days in 1957. The standard severity rate was 2,553 days of disability per million employee-hours worked, essentially the same as for 1957. This relative stability in injury severity prevailed in all the contracting subclassifications except general building contractors. In this activity, the average disability per injury jumped from 56 days in 1957 to 79 days in 1958 and the standard severity rate moved from 1,953 to 2,635. This resulted from a relatively sharp rise in the proportion of deaths and a minor rise in the proportion of permanent impairments.

The total volume of disabling work injuries in contract construction was slightly lower in 1958 than in 1957—195,000 compared with 200,000. Since the rate of injury occurrence did not change appreciably, this drop in injury volume was due entirely to the lower employment in the industry during 1958.

Auto Accidents Studied

Experts know about the "who, what, when and where", of traffic accidents but greater knowledge about "why" these accidents happen would be invaluable to automotive and traffic engineers, highway designers, public officials and safety organizations.

During the past 20 years, accident prevention efforts have resulted in a 60 percent reduction in the nation's traffic fatality rate. Far-reaching progress has been made in the various engineering aspects of the problem, but less has been accomplished on the human side.

A team of scientists at Northwestern University's Traffic Institute is making a new effort to find out "why." The real cause is seldom apparent, and may be something deep-seated in the driver, or a highly complicated, inter-related set of contributing factors.

To get such facts, the Institute has developed the first fully scientific method of investigating basic causes underlying traffic accidents.

This long-range project is promoted and financed by the U.S. Bureau of Public Roads, the U.S. Public Health Service and the Automotive Safety Foundation, which is a national organization supported by automotive and allied industries.

Among the many questions for which answers are sought are the following: What is the real significance of emotional instability and recklessness in traffic accidents? What is the specific effect of alcohol

(Continued on page 59)

Revised Safety Code for Industrial Trucks

A revision of American Standard Safety Code for Powered Industrial Trucks, B56.1-1959, has been approved by the American Standards Association and published by The American Society of Mechanical Engineers. The revision includes a new appendix on stability tests, which describes the construction and use of a tilting platform test device for industrial trucks. Four tests can be made with this platform—longitudinal stability while stacking and while traveling, and lateral stability while stacking and while traveling.

The American Standard is designed to serve as a guide for state, municipal, and other governmental authorities in forming safety regulations, and for voluntary use by businesses using materials handling trucks. Previous editions have been in use since 1950.

Representatives of government and labor, as well as users and manufacturers of industrial trucks, served on the ASA sectional committee that drew up the standard and keeps it up to date. The project was sponsored by ASME.

Powered industrial trucks include fork trucks, platform trucks, crane trucks, and tractors used in factories and other industrial operations. The code does not cover over-the-road equipment or earth-moving machinery.

Elements of design, operation, and maintenance of powered industrial trucks are covered by the code. The current revision includes nomenclature changes as well as the new section on stability test criteria. The 48-page publication covers such design and construction features as overhead guards, steering geometry, braking efficiency, and capacity ratings. Safety rules for the use of industrial trucks are included, as well as for maintenance.

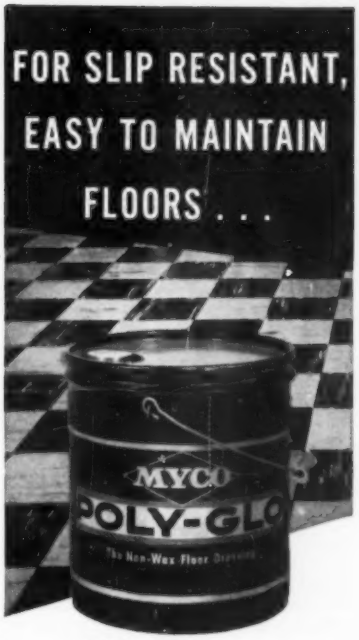
The revised American Standard Safety Code for Powered Industrial Trucks, B56.1-1959, is available at $1.50 a copy from The American Society of Mechanical Engineers, 29 West 39th Street, New York 18, New York, or from the American Standards Association, 70 East 45th Street, New York 17, New York.

U.L. Studies Gas Vents

Underwriters' Laboratories, Inc. has published Research Bulletin No. 51 entitled "Performance of Type B Gas Vents for Gas-Fired Appliances." This bulletin, the result of two-and-one-half years of investigation at the Laboratories' Northbrook Testing Station, represents the first extensive laboratory study of Type B vent performance of gas-fired appliances under conditions of field installation.

Part I reports an investigation conducted to provide information and definite technical data relating to the performance of Type B gas vents when used in systems to vent appliances. It was conceived for the purpose of promoting uniformity in standards, codes, and regulations relative to the testing, installation and use of Type B gas vents. To determine the operating factors of performance, the vents were tested in simulated field installations when connected to a flue-gas generator and to each of five kinds of gas-fired appliances.

Part II is a survey of available information on the ignition of wood



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(Use Key # M-20 on Inquiry Card on page 1)

exposed to moderately elevated temperatures. Records of actual incidents, laboratory reports on experiments, and published technical literature were reviewed. They indicated authentic instances of the ignition of wooden surfaces exposed for long periods of time to low-pressure steam pipes and similar heat sources; the temperatures of which were in the order of 100 to 120 C (212 to 248 F).

Based on Interviews

Reports on fires and accidents in the field attributed to gas vents were obtained by personal interviews with authorities in 68 cities and counties throughout the United States.

Copies of the Bulletin may be obtained by writing the Public Relations Division, Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago 11, Illinois.

Grading Standard for Abrasive Products

Printed copies of a new Commercial Standard for grading of abrasive grain on coated abrasive products are now on sale at the Government Printing Office, according to the Commodity Standards Division, Office of Technical Services, U. S. Department of Commerce.

The standard was requested by the Coated Abrasive Manufacturers' Institute and was recently established by the voluntary endorsements of individual producers, distributors, users and testing laboratories. It designates nationally recognized grading limits for the various sizes of mineral grits used in the production of coated abrasive sheets, belts, discs, rolls, and similar products.

Uniform procedures for recovering the grain from the coated product and for testing it to determine conformity with the grading limits set by the standard are also provided. Copies of "Commercial Standard CS217-59, Grading of Abrasive Grain on Coated Abrasive Products," are available for 15¢ each from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Aviation Fire Safety

Major aspects of aviation fire safety are covered in a group of seven new publications released by the National Fire Protection Association. Three concern aircraft maintenance fire hazards, two deal with the specialized field of aircraft rescue and fire fighting services and equipment.

Developed by the NFPA Committee on Aviation through its Sectional Committee organization, these publications are the result of years of work by an international group of aviation safety experts representing the United States, Canada, England and Australia. Official adoption of the texts took place at the 63rd NFPA Annual Meeting.

Attacking the fire hazards of aircraft maintenance individually by process analysis, this year the Sectional Committee on Aircraft Maintenance and Servicing secured final adoption of their Recommendations on Safeguarding Aircraft Electrical System Maintenance Operations (NFPA No. 410A) and Aircraft Breathing Oxygen System Maintenance Operations (NFPA No. 410B).

Tentative adoption of its Recommendations on Aircraft Fuel Tank Repair Operations (NFPA No. 410C-T) permits industry-wide circulation of the text for comment and criticism prior to final action. This procedure is customarily followed by the Association to assure that all concerned have opportunity to test-out the practicality of the safeguards recommended.

Refueling Problems

Fueling aircraft is becoming increasing sensitive with the increase in fuel capacities of the new jet transports. A new edition of the Standard on Fueling Aircraft on the Ground (NFPA No. 407) includes revisions of the text on spill prevention and control, ramp fueling locations and positioning of aircraft fuel servicing vehicles, fire extinguishers for the ramp and fueling vehicles, plus changes on hose couplings, marking of the hose and the rated working pressure of vehicle fuel system components.

In addition a Tentative Standard on Airport Fixed Fueling Systems (NFPA No. 407A-T) sets forth recommendations on the proper installation of airport fixed fuel storage and piping systems including valving, testing procedures, filtering, the installation and location of fueling hydrants and fueling pits and hydrant vehicles. Again, tentative action on this standard is designed to give all concerned ample opportunity to review and propose improvements in the text prior to final application.

The widely used Suggestions for Aircraft Rescue and Fire Fighting Services for Airports (NFPA No. 403) was changed this year primarily in only two phases: those dealing with magnesium fire control and heliport protection. The new heliport recommendations deal with landing facilities (on roofs, platforms or at ground level) used exclusively for helicopter operations.

A new text on Suggested Test Procedures for Aircraft Rescue and Fire Fighting Vehicles Utilizing Foam (NFPA No. 412) is to assist airport management in determining the capabilities of their vehicles on the airport being served prior to the time that an emergency might demand their optimum performance.

Copies of the seven new publications, as listed below, are available from the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass.:

Aircraft Electrical System Maintenance Operations (NFPA No. 410A, 12 pages, 40¢)

Aircraft Breathing Oxygen System Maintenance Operations (NFPA No. 410B, 18 pages, 50¢)

Aircraft Fuel Tank Repair Operations (NFPA No. 410C-T, 12 pages, 40¢)

Fueling Aircraft on the Ground (NFPA No. 407, 44 pages, 75¢)

Airport Fixed Fueling Systems (NFPA No. 407A-T, 12 pages, 25¢)

Aircraft Rescue and Fire Fighting Services for Airports (NFPA No. 403, 62 pages, $1.00)

Aircraft Rescue and Fire Fighting Vehicles Utilizing Foam (NFPA No. 412, 28 pages, 50¢)

THE FIRE FRONT

How Bad Were Fires During 1958?

This country managed a slight gain last year in the never-ending struggle against destructive fire, the National Fire Protection Association reports. But the gain was too fractional to be the cause for any real celebration.

In approximately 1,994,000 fires in 1958, value of property destroyed came to a little less than $1,279,000,000. Compared with the previous year, this was a decrease of about $1,100,000 in dollar losses and about 32,000 fewer fires, according to the annual analysis compiled and published by the Association's Fire Record Department.

While over-all losses were checked slightly, more American homes went up in smoke than ever before in history. Fire destroyed or damaged 558,000 dwellings in 1958, causing a loss of approximately $309,000,000. These totals, which are new highs, represent an increase of 28,000 in number and $32,750,000 in dollar cost over the previous year.

Causes of Fires

Principal causes of the building fires—which the National Fire Protection Association declares are almost all avoidable—were defective heating and cooking equipment, and careless smoking.

Damage to buildings of all types totalled $1,056,308,000, down nearly $12,000,000 from the previous year, with 866,700 structures involved in fire. A better fire record compiled by manufacturing plants, which showed a drop from almost $186,000,000 to about $175,000,000, was largely responsible for the decrease.

The dollar cost of school and college fires also declined more than $6,000,000, to just under $24,000,000.

There were an additional 1,126,875 fires not involving buildings—principally aircraft, motor vehicles, forest, ship, rubbish and grass fires—which accounted for an estimated $222,500,000 loss, according to the National Fire Protection Association report.

In this classification, aircraft fire losses amounted to $143,000,000, up $28,000,000 from the 1957 total, although the number of aircraft involved dropped from 200 to 175.

Fires Up in September

Estimated fire losses in the United States during September amounted to $83,027,000, the National Board of Fire Underwriters has reported. This loss represents an increase of 13.3 percent from losses of $73,303,000 reported for September, 1958, and an increase of 11.2 percent from losses of $74,660,000 for August, 1959.

Losses for the first nine months of 1959 now total $800,887,000, a decrease of 1.2 percent from the first nine months of 1958, when they amounted to $810,811,000. These estimated losses include an allowance for uninsured and unreported losses.

Motor vehicle fires showed an increase in both numbers and cost in 1958. There were 173,000 such fires, with total losses of $18,700,000 compared with figures of 160,000 and $17,200,000 for the previous year.

What causes all these destructive fires?

Topping the list of building fire causes is defective or overheated cooking and heating equipment. They were responsible for starting an estimated 193,000 fires in 1958, doing $149,158,000 worth of damage.

Second principal cause is careless smoking, which started 150,000 fires destroying $70,590,000 in property. This was a 15 percent increase in number and a $1,310,000 increase in cost.

Other important causes were:

	Fires
Electrical	117,100
Rubbish	57,900
Flammable liquids	53,500
Open flames, sparks	52,500
Lightning	33,400
Children and matches	31,600

Incendiary and fires of suspicious origin increased by 40 percent during the year. There were 21,000 of them, causing total damages of $31,656,000.

Covering uninsured as well as insured losses, the National Fire Protection Association's annual compilation of fires and fire losses is rated the most complete and accurate report of its kind. The organization's Fire Records Department prepares estimates from reports submitted by federal, state and local fire authorities, as well as from industrial and other sources concerned with fire.

U. S. metalworking plants managed a reduction of about $5,000,000 in fire losses the past year. Total cost of fire damage and destruction to manufacturing facilities came to just under $23,000,000 in 1958, against a figure of about $28,000,000 for the previous year.

Petroleum Fires

Fire losses in petroleum facilities rose sharply. Damage and destruction of refining and bulk storage plants cost more than $16,500,000 in 1958, against about $11,300,000 the year before. The estimates also show an increase in number of fires, in these facilities, from 1,500 to 1,800.

Garages and service stations made an impressive gain. The 1958 cost of fire damage and destruction in garages and stations was down

more than 20 percent. Losses, however, still totalled $27,100,000.

Fires cost lumber and coal yards almost $17,400,000 last year. The 1958 loss total is a decrease of approximately $1,600,000 from the previous year. The estimates show a rise in the number of yard fires, however, from 1,600 in 1957 to 1,800 in 1958.

Fire Tests for Plastic Structural Panels

Results of fire tests of standard (Commercial Standard CS 214–57, Type I) glass-fiber reinforced polyester corrugated structural plastic panels as roof-lighting materials have been released by the Fiberglass Reinforced Panel Council of The Society of the Plastics Industry, Inc. The tests were conducted for the Council by the Factory Mutual Engineering Division.

The Factory Mutual Laboratories' report is a guide in establishing proper limitations for the use of the product in building roofs.

The tests were occasioned by the steady growth in the use of reinforced plastic panels for roof lighting calling for the establishment of up-to-date building code regulations for the product. Such regulations are expected to evolve out of the SPI tests.

Method of Testing

The tests were conducted on a 20 ft. by 100 ft. building, exposing to fire two different roofing patterns consisting of standard reinforced plastic panels alternated with panels of noncombustible roofing (corrugated galvanized iron).

As a result of the tests, the following recommendations were made by Factory Mutual Engineering Division for this type of panel when interchanged with noncombustible sheets in building roofs:

1. In buildings with complete automatic sprinkler protection, standard type plastic sheets may be used without area limitations.

2. In roofs of noncombustible buildings without automatic sprinkler protection where the building occupancy does not require sprinkler protection, the total amount of standard reinforced plastic used in the roof should not exceed 25 percent of the roof area; panels of standard reinforced plastic should be separated on all sides from other reinforced plastic panels by a space of noncombustible material equal to three times the panel width; and the total area of any single area of standard reinforced plastic roof paneling should not exceed 400 square feet.

3. The method of fastening for these sheets should be capable of resisting a gross wind uplift force of either 30 pounds per square foot or 45 pounds per square foot, depending upon the geographical location, as specified in the standards of the Factory Mutual Engineering Division.

Copies of the report may be obtained from The Society of the Plastics Industry, Inc., 250 Park Avenue, New York 17, N. Y.

New Fire Defense

A new defense against the spread and danger of fire are more effective fire retardant paints. Recent developments in the material have improved it to a point where it opens tremendous new possibilities in protecting both people and property from fire, said Dr. Leroy W. Shuger, vice-president of the Baltimore Paint & Chemical Corp.

Tests indicate that when the paint is spread on the walls and ceiling of a room or corridor, it will resist the spread of flame and formation of smoke for periods of as much as 45 minutes to one hour. Dr. Shuger spoke at a session of the National Fire Protection Association's annual meeting.

How Paint Protects

The paint does its protection job by expanding into a thick, puffy wall of insulation when exposed to the heat of fire, explained Shuger. "It acts to protect the surface under it against the heat of fire, and in addition, flame spread is stopped at the point of contact with the paint."

Fire retardant paints have been thoroughly laboratory-tested and their use is steadily increasing in military installations, schools and other public institutions. Recent improvements have made the paint as attractive, durable and as easy to apply as conventional paints, the speaker said. He urged that fire protection people seek out applications where fire retardant paints might provide increased safety.

Underground Tank Leaks

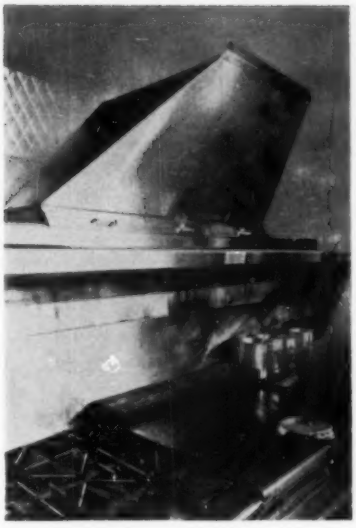
A new guide on dealing with the problem of underground tank leakage has been issued by the National Fire Protection Association. From cases of leaking underground tanks reported to the NFPA, gasoline has traveled as far as three miles underground before entering a building. In addition, depending on soil conditions, the gasoline has remained underground to show up in buildings for periods up to two years after the leaking tank has been removed.

Extreme Hazard

Millions of gallons of flammable liquids are stored in underground tanks, the pamphlet points out, and it is of vital importance—economically as well as from the potentially hazardous conditions such tanks may present—that proper methods of installation be understood and practiced.

The guide covers the proper methods for installing underground flammable liquid tanks, minimizing losses and detecting leaks, protecting contaminated areas, detecting sources of seepage and other features. The material was developed by the NFPA Sectional Committee on Maintenance and Repair, under the chairmanship of T. H. Wright of the Ohio Inspection Bureau, Columbus.

Copies of the publication (NFPA No. 329M, 20 pages, 50c per copy) are available from the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Mass.



Kitchen Exhaust Systems

Hotels and restaurants should provide hoods or other primary collecting means to collect grease laden vapors from cooking operations and ducts to carry these vapors away in a safe manner, warns a recent bulletin of the National Board of Fire Underwriters.

There are several different methods of taking care of these conditions. The simplest is a hood with a horizontal duct leading to a fan and discharging through the exterior wall to the outside. Under these conditions the principal features to be considered are the exposure which the outlet forms to other buildings and the danger of igniting or damaging the exterior wall of the building if combustible material in the duct catches fire.

In large installations one or more collecting ducts should connect to a metal exhaust stack or a special flue installed for the purpose of exhausting grease laden vapors. In no case should discharge of these vapors be directed to a chimney used for heating equipment or other purposes. Where metal stacks are used they are generally located outside the building, securely attached to the wall, and extend above the roof. When located inside the building they should be enclosed in a shaft, preferably constructed of masonry at least the equivalent of 4-inch hollow tile and extending continuously from the first floor pierced and through the roof. Care should be exercised in locating the outlet of the exhaust duct a safe distance from combustible material or any building or structure.

Grease Problem

Any duct from cooking equipment may be expected to collect considerable combustible material usually in the form of grease. When this material is ignited the natural draft produces an intense heat. In addition drippings from the duct may produce fire and smoke in the room from which the duct extends.

Ducts should be at least 18 inches from any unprotected combustible material and should not extend through fire walls. They should be as straight as possible to avoid accumulation of grease and to facilitate cleaning.

Ducts should be kept as free of grease as possible. To do this filters or other means of grease extraction should be provided in the exhaust system to catch the grease. This cuts down accumulations of grease in the duct but does not eliminate the hazard of ignition.

Grease filters or other grease extraction means should be cleaned at regular and frequent intervals. One large group of restaurants has a well enforced rule that all filters, hoods or other primary collecting means shall be cleaned daily. The inspecting authority will do well to keep a careful check on installations having filters or other grease extraction means, particularly as to their need of cleaning.

Methods of Cleaning

The entire exhaust system should be inspected periodically to determine if cleaning is necessary. Hand holes, for inspection and cleaning, should be placed in the sides of horizontal sections of exhaust ducts. Such openings should be protected with tight-fitting sliding or swinging doors and latches. Thorough cleaning of ducts, hoods and fans usually requires scraping, brushing or other positive means. Steaming an exhaust system will be effective in removing much of the grease. Washing or swabbing with a non-flammable grease solvent is also effective.

One of the principal features in connection with a fire in a duct from a range or broiler is that it is likely to occur during the preparation of food at the busiest time of the day. The interruption, and the probable damage to food, are seriously objectionable.

Fire Equipment

Where such fires occur, they can be extinguished by portable carbon-dioxide or dry chemical extinguishers or portable water spray equipment if the exhaust system is small and the inlet or top can be readily reached.

In large installations effective extinguishment can be accomplished by means of fixed pipe inert gas, dry chemical or fine water spray systems. Steam, if used, should be continuously available in sufficient quantity. By providing suitable thermostats in the exhaust system the extinguishing agent can be released automatically. Manual operation of the release may also be effective.

Exhaust duct fans should be installed to automatically shut down in the event of a fire in the exhaust ventilating equipment. Dampers should not be installed in any portion of the exhaust system except when using fixed pipe fire extinguishing systems.

Picture by courtesy of Bohnne Enterprises.

Pumping a Blanket to Smother

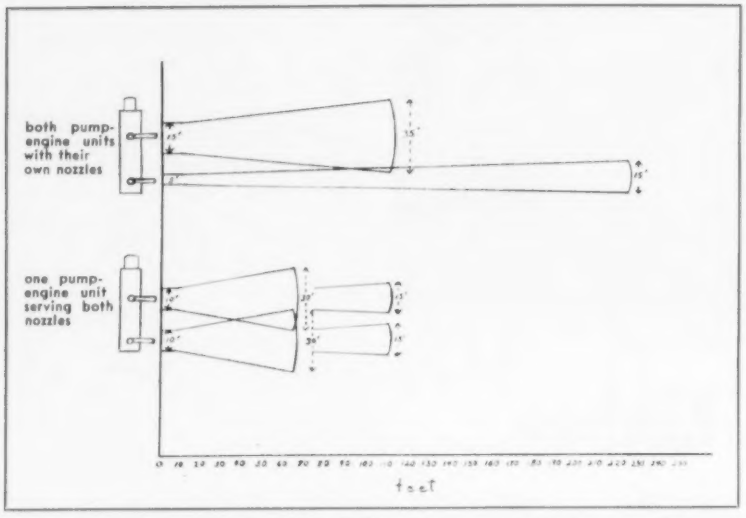


Fig. 3: A visual comparison of the lengths of foam spray that can be delivered from both nozzles of generator when one or both pump-engine units are working.

Three gasoline storage tanks in flames, another six burning at their vents, 25,000 gallons more feeding the fire from a ruptured line. An out-of-control blaze, threatening to wipe out the town of Andale, Kansas, upon which more than 100,000 gallons of water had been poured in vain. Yet, within minutes, it was completely smothered under a blanket of foam.

A spectacular, yet quite typical, example of the performance of the world's largest mobile foam generator which, with its two pumps each having a free-flow liquid capacity of 675 gpm, can deliver as much as 60,000 gallons of foam in four minutes. Besides being credited with a greater capacity than any other land fire-fighting equipment in the world, the unit is specially geared for speed, accelerating to 45 miles an hour in 60 seconds with full load and having a top speed in excess of 67 mph.

A B-47, its landing gear jammed closed, circled above McConnell Air Force Base in Kansas, five, ten, fifteen minutes, and a single mobile foam generator had spread a 5-in.-thick blanket of foam 35 feet wide and 3000 feet long. The B-47, coming in at 119 mph, slid 1665 feet down the foam-blanketed runway to a safe landing. No fire; only minor damage to the airframe—the foam blanket acting both as a lubricant to minimize the friction which is a common source of fire in this type landing and as an extinguishing agent. By contrast, in a similar incident at the Los Angeles International Airport, it took three crash trucks 25 minutes to lay a 3-to 4-in. blanket, 70 feet wide and 1680 feet long—a 21 percent smaller volume of foam.

This mobile foam generator comprises a tractor-truck powered by a 320-hp. engine and a semi-trailer of the "frameless" type consisting, primarily, of a 4450-gal. water compartment, a 500-gal. foam compartment and an engine and pump department. Turrets of the "blabber-mouth" type are mounted on platforms atop the trailer, one at the front and one at the rear. Water and foam agents are pumped to these turrets by two side-suction centrifugal pumps, with a free-flow rating of 675 gpm at 2600 rpm, each powered by a 120 hp. gasoline engine.

The development of a fire fighting unit of increased foam capacity, greater range and flexibility of spray pattern and nozzle operation, and higher speed was initiated by Fire Marshal Willis E. Seal of Boeing Aircraft's Wichita, Kansas, plant at the time the company was tooling for the B-52 in 1956. The original specifications were worked out by the U. S. Fire Protection Engineering Service, Inc., consulting engineers of Kansas City, and translated into this mobile foam

Fig. 2: The mobile foam generator exceeds any other land fire fighting equipment in capacity; can deliver longer foam stream, up to 225 feet, both nozzles at once.

a Fire

generator. The first truck-trailer went into the field in 1957, ordered by the Air Force Air Materiel Command.

Uses for Mobile Foam Units

While airfield fire protection for large aircraft use was the basis for design, these units offer operational and economic advantages for oil refineries and tank farms, chemical plants and others handling flammable liquids, for aircraft factories and municipalities as well. A report by the Air Force titled, "Operating Costs in Quantities Required for Large Aircraft Fire Protection," reveals that two of these huge units provide the same protection as three Type 0-12, eight Type 0-11B or 13 Type 0-10 crash trucks and at a substantially lower initial investment cost. Further, lower operating and amortization costs were found to effect substantial yearly savings.

This greater volume as well as the greater range of spray of these mammoth units are products of the two powerful pumps which can deliver more than 600 gpm of liquid each to the nozzles at a pressure of 165 pounds per square inch. Whereas the spray of other fire fighting units can reach no further than 60 feet, this mobile foam generator can throw two streams of foam a maximum of 225 feet. Volume of foam depends upon the proportions of water and foaming agent used and, to a degree, upon the hardness of the water. Given the best of both conditions, the unit can produce up to 15,000 gal. per minute. These figures represent maximum performance with all engines, pumps and nozzles in operation. Flexibility, though, as well as high capacity, has been built into this equipment to meet the varied conditions encountered in fire fighting and to assure unfailing operation.

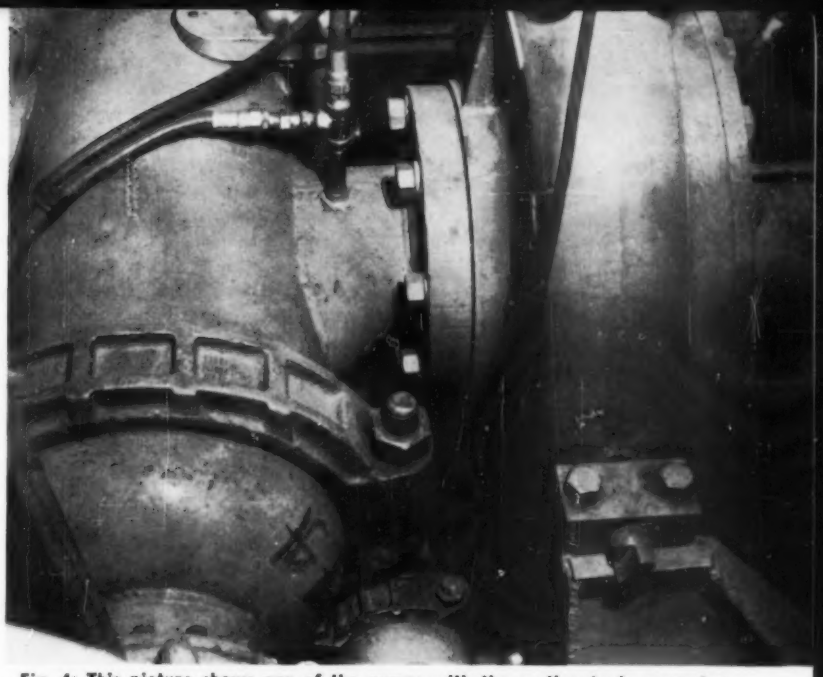


Fig. 4: This picture shows one of the pumps with the suction tank appearing at left and the flange-mounting to the gasoline engine being shown at right.

The foam producer incorporates two complete pumping systems including pumps, engines, turrets and auxiliary hose connections. Each centrifugal pump is paired with a 120 hp. gasoline engine, flange mounted directly to the pump and connected through a flexible coupling. The engine-pump assemblies are installed on either side of the back compartment of the trailer which is accessible through a door.

The right-hand pump and engine are connected for normal operation to the front turret and the right-hand hose reel auxiliary connection housed in a cabinet in the side of the trailer, the left-hand pump-engine assembly to the rear turret and left-hand auxiliary hose connection. However, should one engine fail, there are interconnections which make it possible for the other pump-engine unit to supply water and the foam solution to either or both turrets and outside hose connections. Either or both pumping systems can also be operated with pump suction directly connected to a fire hydrant.

(Continued on the next page)

Fig. 1: The two specially-designed 675 gpm, side suction centrifugal pumps used in mobile foam generator can deliver 15,000 gallons a minute at 165 psi pressure.

Additional, optional, interconnections between the pump-engine units, turrets and auxiliary hose connections make it possible for the pumps to be operated in series—both units pumping water and the foam liquid to one turret or hose outlet. Either pump can be used as the high pressure stage and suction may be taken from either the trailer water compartment or directly from a fire hydrant. Operated thus in series the mobile foam generator can throw a single spray up to 450 feet, using a special nozzle.

The two pumps were specially designed for this application and are ribbed and reinforced to withstand the high pressure of series operation. After tests of series operation at pressures up to 350 psi, the housings have shown no signs of damage. Special consideration was also given to the pumps' operation in freezing weather. The carbon seal for the shaft is lubricated with a light weight mineral oil. This, naturally, reduces chances of possible damage to the seal at freezing temperatures. Pump case and cover are cast iron; impeller and seal rings are bronze; shaft, bolts and studs are stainless steel.

The pump-engine units are normally started by the turret operators from the instrument panels—one for each—mounted on the rear of the vehicle on either side of the door to the pump-engine compartment. These panels carry a full complement of instruments and controls. However, at each turret stand there is another starting button for the engine normally connected to that turret as well as a foam discharge selection switch.

Versatile Spray Patterns

These balancing metering valves are readily adjustable to provide the percentage mixture of water and foam solution required. The adjustment for different rates of flow for any given percentage setting is automatic as is the cut-off of foam injection when water in the tank compartment is exhausted. The valve also automatically prevents double foam injection when the pump-engine units are put into series operation.

The "blabbermouth" type turret nozzles can be adjusted to throw a straight solid stream or a flat pattern. As can be seen in Figure 3, with both pumps, engines and turrets in operation, each nozzle can project a straight stream 15 feet wide a maximum distance of 225 feet. The range of the foam spray is reduced by one half, to 110 feet, when the nozzle is switched over to throw a flat pattern 35 feet wide. Even with one pump-engine unit serving both turrets the mobile foam generator can project its spray further than the 60 feet which is the maximum range of other equipment. By comparison, with one pump supplying both nozzles with liquid at 90 psi, the unit can throw two straight solid streams 15 feet wide a distance of 110 feet and two flat patterns 30 feet wide a distance of 65 feet.

With its long reaching spray, the mobile foam generator can fight the most intense fire from a distance both safe and more comfortable for its three-man crew. With its high gallons-per-minute foam capacity it can lay down the thickness of foam necessary to smother a fire quickly and permanently. Heat destroys a fragile blanket of foam and flames roar up again. At the Andale, Kansas, oil fire, cited earlier, the 70,000 gallon foam blanket laid down by the generator was still so tough five hours later that no standby fire equipment was deemed necessary during the transfer of 10,000 gal. of gas from storage to transport tank trucks.

This fire also illustrates the speed and maneuverability of the equipment. With the flames out of control, a call for the mobile foam generator was put through to the Boeing Wichita plant 31 miles away. Immediately, at 12:35 pm, the unit started for Andale arriving just 38 minutes later. With traffic clogging all approaches, the truck first was run over the railroad track ties and then over ground soggy with over 100,000 gallons of water. Even hauling the loaded gross weight of 71,340 lb., this truck-trailer attained a top speed of 67 miles per hour. The unit's low center of gravity is credited with its excellent maneuverability; its low gearing with its high, safe speed over rough terrain. The tractor-truck was especially designed for this service but it was assembled from standard commercial components to assure readily available service parts.

Fires are no respecters of weather and the mobile foam generators are specially insulated and equipped to operate at freezing temperatures. Engine compartment and auxiliary hose connection cabinets are insulated with asbestos sheet and coatings of asphalt and asbestos. Winterization and space heaters may also be installed to heat the compartments and provide forced warm air to the turrets. These units may also be equipped with a 2-way radio to permit intercommunication between tractor cab and headsets in the turret operators' helmets.

Pictures by courtesy of Fairbanks, Morse & Co.

National Safety Congress

(from page 34)

Safety has an economic as well as a humanitarian side for the employee too. Injury or death to a worker, said Walter E. Biery, president, Mid-Continent Pipe Line Co., Tulsa, Okla., causes his family "anguish and suffering, along with a loss of income that creates an economic catastrophe that affects all members of the family."

"To the employer," Biery said, "injury or death to a worker is a capital loss in the investment of a trained, skilled and trusted employee.

"A sound safety program producing a good safety record is proof of competent management," he added.

An Ohio safety man has come up with a money-saving suggestion: "Take a look at your safety program," said Russell W. Frank, safety director, Ferro Corp., Cleveland.

One Cleveland company, for example, used to pay nearly 3 percent of its payroll for workmen's compensation insurance. Now, thanks to a stepped-up safety effort that resulted in fewer work injuries and fewer insurance claims, the firm pays less than 1 percent. "And this," Frank said, "represents only the savings in reduced insurance premiums for workmen's compensation coverage."

Safety Programs

From running in the building to wearing neckties—that's the range of things Pennsylvania safety experts say should be prohibited in vocational school shops to assure the maximum protection of students. The safety suggestions came out of a statewide study, results of which were discussed by William A. Williams, professor of industrial education at Pennsylvania State University, University Park, Pa. One fact turned up in the study: Only about 4 out of 10 shop teachers use safety checklists during inspections, though more than 9 out of 10 favor using them, according to Williams.

Failure is in store for an industrial safety program if "you can't impress on each individual the importance of safety," a Michigan man told the convention. "A man who has not been sold on safety," said William H. Stubbs, training director, American Box Board Co., Grand Rapids, "will walk by or work around a hazardous condition without seeing it because he is not safety conscious.

"People buy safety for the same reasons they buy washing machines, autos or fur coats," he declared. "It is up to the salesman—the safety engineer—to find the basic drive that will motivate each of us, and then present his material in such a way as to motivate us in the right direction."

Labor unions are greatly concerned for their members' safety, a labor union official declared—and they should be.

"It is sad but true," said John M. Elliott, "that some people believe safety is solely a management concern and that the union has no place in a safety program." The executive vice president of the Amalgamated Association of Street, Electric Railway and Motor Coach Employees of America, AFL-CIO, told delegates: "Safety is as much a concern of the union as it is of the management."

S.C.P., a new technique for furthering safety, was described by David T. Smith, supervisor of plant protection at the Chambers (N. J.) Works of E. I. du Pont de Nemours. S.C.P., he explained, stands for safety control program. "It represents a new approach to evaluating and stimulating industrial safety programs," he said. It is an attempt to measure employee attitude and accident potential by looking for unsafe acts and conditions. It is a new safety tool that presents the safety picture to management in the same terms as they get reports on product quality. "This technique," said Smith, "enables us to predict when injuries are likely to occur and gives us a chance to take appropriate action."

The dollars and cents value of safety was cited by Gordon D. Albers, safety director, George A. Hormel & Co., Austin, Minn. He told of an 11-week period in 1958 during which a series of accidents occurred, involving slips and falls and dropping material on the feet. Wage losses totaled more than $6,000, not counting production losses and fringe benefits. Total cost of the injuries, according to Albers: close to $16,000.

A concerted effort to get employees of the firm to wear slip-resistant, toe-protecting safety shoes resulted in this 11-week showing in 1959: Wages lost—$2,224. Total loss —$3,000.

What determines success or failure of an industrial safety program? "Thorough preparation leading to employee acceptance," in the opinion of R. E. Prittinen, supervisor of personnel relations, Michigan Ore Div., Jones & Laughlin Steel Corp., Negaunee, Mich.

"We have found the most successful means of insuring employee acceptance is to solicit the aid of employees in preparation of the safety program." In this way, employees "become aware of existing hazards and usually offer suggestions on how to prevent work injuries."

"We do not prepare any job or safety analysis without soliciting the aid of workers on that job," he said.

You can install every protective device known to man on a machine and still not have safety! "There is one safety feature it's impossible for any press builder to incorporate in its design," said George H. Martlock, "and that is a safe worker."

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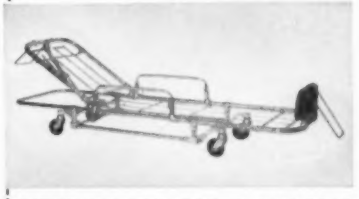

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(Use Key # M-12 on Inquiry Card on page 11)

Martlock, Midwest district sales manager, Ajax Manufacturing Co., Cleveland, told delegates: "Most accidents occur due to the carelessness of the workman. A safety-conscious workman is one who knows the hazards of his job and fully realizes the dangers evident from one careless moment. If safety can be instilled in workers, we will have obtained one of the best safety features of any piece of equipment."

Safety is not just a sometime thing with workers at General Motors' pressed metals division in Flint, Mich. "We extend our safety program beyond the plant and into the home of each employee," said Ronald O. Warner, GM operations manager.

"We try," he said, "to demonstrate to the whole family the genuine interest we have in making our plant a good place to work because it's a safe place to work.

"The family plays a part in our safety program because they stand to benefit from its successes." Industry, he continued, has an obligation to prevent accidents. "If we turn our back on safety violations and fail to enforce the rules, then we share the responsibility for any accidents that occur."

How does a firm set a safety record? An answer to the question was given by a man whose firm established a most enviable record—world's safest chemical company. He is F. M. Acker, plant manager of the Old Hickory (Tenn.) plant of E. I. du Pont de Nemours & Co.

The main ingredients of an effective safety program? "The boss," he said. "The boss must be the pace setter who sets the stage for safety of operation. The person who just gives lip service to personal safety does as much to retard it as he does help it. If your place is to be safe, the boss must not only believe in safety, but take an active interest and set an example."

Pittsburgh Plate Glass Co. uses "Interest stimulators" to promote safety, according to John J. Long, director of safety and plant protection, Works 7, Cumberland, Md. He told delegates of two of the firm's stimulators. One was a safety slogan contest in which employees' families also took part, while the other, titled "Safety Shoe Month," involved awarding prizes to workers who bought safety shoes.

How Owens-Illinois Glass Co., Toledo, Ohio, used bars of soap to promote a no-accident month was explained by H. V. Gardner, safety director. Employees were given a bar of soap stamped with the words, "Keep your record clean," and were reminded of the goal—an accident-free month. That's just one of the ways Owens-Illinois promotes safety.

"These campaigns are helpful in getting emphasis on safety," he said. What effect do they have? A "considerable drop" in the number of lost-time accidents, and fewer lost-time accidents during the months immediately before and after the campaigns, Gardner said.

How a rocket-motor manufacturer blasted off a safety program that is still in orbit was described by C. D. Attaway, chief safety engineer, Thiokol Chemical Corp., of Marshall, Tex. In 1953, with 265 employees, Thiokol had a frequency rate of 7.61. By 1957 the figure was down to 1.26. In 1958, Thiokol, with more than 1,300 employees, earned the National Safety Council's award of merit for recording a million man-hours without a lost-time accident. This year, the company passed the two million accident-free man-hour mark, Attaway said.

An insurance man gave some clear tips about a beclouded subject. "Expressway driving," said Edward R. Klamm, accident prevention director, Allstate Insurance Companies, Skokie, Ill., "requires special skills and involves special hazards. There is no room for amateurs on our expressways." He urged that young drivers especially be properly prepared for the "specialized business of safely negotiating" superhighways.

He listed these as some of the pitfalls motorists should try to avoid in superhighway driving:

1. Stopped cars. "Collisions with stopped vehicles," Klamm said,

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ladder climbers
seat belts
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rope grab and cell shock absorbers
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(For details, use Key # M-13 on Inquiry Card on page 1)

"are one of the leading killers on expressways."

2. High speeds and the resultant strain on the car. "Drivers should learn the importance of the condition of their car when driving on expressways."

3. Running out of gas, tire trouble and overheated engines. "If the driver cares for his car properly, it is unlikely he will become a stopped-car hazard."

4. Following too closely. "Higher speeds and increased stopping distances require longer following distances."

State legislatures were urged to "take a cold, fresh look" at procedures for getting and keeping a driver license. The admonition came from Norman Damon, vice president, Automotive Safety Foundation, Washington, D. C.

"Why can't we encourage our legislatures and driver licensing authorities to adopt some of the principles companies employ in the selection and training of their drivers before trusting them with expensive equipment and lives?" he asked.

Stressing the importance of drivers' attitudes toward other drivers and life in general, he quoted another safety expert's statement that "people drive as they live." However, he continued, the reckless impulses resulting from irritability or emotional upsets may be checked by the force of good driving habits.

Conceding that driver education had made a rapid advance, with about a million and a quarter high school students receiving some form of this training, Damon added that only 760,000 students are trained according to the "highest national standards."

Transit companies have found a new way to reduce the number of traffic accidents. It's through use of commentary driving. "In commentary driving," explained Glenn V. Carmichael, assistant director of training, Northwestern University Traffic Institute, Evanston, Ill., "the driver speaks out loud.

"He gives the supervisor or driver trainer riding with him an impression of his observations, thoughts and intentions regarding control of the vehicle he is driving.

"From what the driver says," Carmichael said, "the supervisor can estimate the quality of the driver's powers of observation, his judgment of traffic conditions and his ability in timing his vehicle-maneuvering to deal with these conditions."

The bus of tomorrow will be designed with your safety in mind. "Safety must be the first consideration in transporting people," explained Jesse L. Haugh, president, San Diego (Calif.) Transit System.

What safety features will the bus of the future have?

Wrap-around, chrome-plated bumpers made of thicker steel than is used today.

Bus steps more than an inch closer to the ground.

Heavily ribbed nonskid rubber matting to prevent slips on steps.

Stepwells heated to eliminate ice and snow, the bane of the winter walker.

Doors widened for easier passage.

Handles near the rear doors for disembarking passengers to grasp.

Windows several inches higher than now so you can see where the bus is without bending or stooping—and then having to make a mad scramble for the exit!

"Have truck, will travel." That's how Fred Lavin views his business. And the trucks, he declared, "are a lot easier to keep safe than the men driving them."

Lavin, production manager, Sugardale Provision Co., Canton, Ohio, said, "we can do what we want to maintain a truck in safe condition, but it is something else to control the actions of people—and more so when they are driving down the highway. In our thinking," he said, "there is no excuse for an accident caused by equipment failure. We can—and do—control this part of the safety problem."

(Additional highlights of the National Safety Congress will be published in the January issue.)

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(For details, use Key # M-14 on Inquiry Card on page 1)

BACK GAUGE FOR PRESS

A completely new type of back gauge called the AAC Quickgage now makes gauge-setting quick, easy, and safe. Practically any changes can be made in seconds, with an accuracy of .001". Operator can make all changes from the front of the press or press brake without ever placing his hands between the dies. Requiring no mechanical clamping, the device can be used also for multiple bends or step gauging with the simplest adjustment. It is versatile—can be adapted with equal facility for gauging behind dies, on dies, for front gauging, or for special positioning.

Using a scale or square or sample work piece, the AAC Quickgage is positioned on a steel plate behind the die. The handle of the unique Q-Wrench moves it for positioning, either from the front of the machine or the back if desired. Flipping a switch on the Q-Rectifier causes the Quickgage to hold in place magnetically, requiring no mechanical clamping. Micrometer vernier adjustment to .001" can then be made by rotating dial with Q-Wrench. Built-in shock absorbers prevent shifting under impact. All repositioning can be done from the front of the press or press brake with the Q-Wrench, which is inserted by the operator between the dies. His own hands are at no time under the dies. Quickgages are particularly useful for plants where frequent changes in set-up must be made. Made by American Actuator Corp.

For details, use **Key # MG-1** on inquiry card on page 1.

"CURTAIN OF LIGHT" SAFETY GUARD

A new photoelectric safety guard to protect workers from danger areas of machines has been introduced by the Photobell Co. Inc. The unit features high reliability because of the absence of radio or vacuum tubes and lower cost than previously available units.

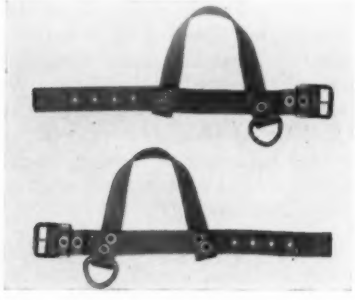
When a "curtain of light," formed by a row of light beams and projected up to 10 feet across the danger area, is interrupted by any part of the worker's body, the machine's stop circuit is instantly activated. The light beams are spaced close enough so that no part of the

MACHINE GUARD DEVELOPMENTS

hand can get through without operating the stop mechanism. After all obstructions have cleared the "curtain of light," the machine will operate without delay.

Fail-safe protection is afforded in practically all cases, including (a) burnout of any lamp in the row of beams; (b) failure of electric supply to the safety guard; (c) damage to the relay coil. With over 20,000 hour lamp life, it is highly dependable with practically no maintenance anticipated. No interference from normal adjacent lighting. Operable 105–125 volts a.c. Rugged components, including heavy sheet metal housing of projector and receiver, are designed to withstand severe vibration from heavy machinery. Guaranteed for one year. Standard unit is 6-lamp, 12" long. Other sizes on request.

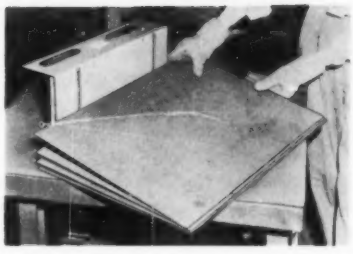
For details, use **Key # MG-2** on inquiry card on page 1.



NYLON WRIST BANDS FOR PULL-BACK PRESS GUARDS

Nylon wrist bands for users of "Possons" pull-back safety devices have been developed by The Positive Safety Mfg. Co. The flexible nylon webbing is said to provide more comfort for operators. Strength is also improved. Tests indicate its usable life to be longer than leather. The bands may be cleaned with soap and water or solvents. They may be used with the pull-back hand guards on punch and toggle presses, embossers, press brakes, drop hammers and other special machines.

For details, use **Key # MG-3** on inquiry card on page 1.



STRONGER SHEET FANNERS

A timely answer to the need for stronger magnetic sheet fanners to handle semi-sticky, bent and heavier gauge steel stock comes with the introduction by Eriez Manufacturing Company of a new group of Ceramic V fanners. Utilizing the new ceramic magnetic pressings, Eriez engineers have designed an assembly which provides the maximum in physical strength and tamper-proof construction. The new units have an all-stainless steel, all welded enclosure, reinforced and supported by a steel back bar; ceramic pressings and back bar are completely enclosed and locked into position with an epoxy.

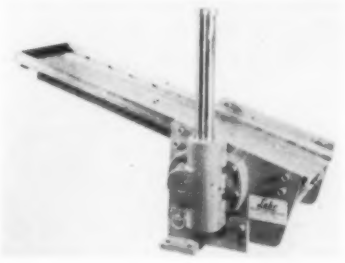
Available in medium, heavy and extra heavy duty strengths, the new units are being produced in a variety of heights to provide complete coverage for all applications up to ⅛" thick steel sheets stacked up to 14" high. The new fanners are particularly effective in the fanning of heavier gauge sheets, up to .125" thick.

For details, use **Key # MG-4** on inquiry card on page 1.

AUTOMATIC RECIPROCATING UNLOADER

A new line of tray-type reciprocating unloaders with variable stroke is now available for removal of parts and blanks from mechanical presses. Made by Lahr Machine & Tool Co., the unloaders are controlled by movement of the press ram. The tray slides underneath the die during up-stroke and receives the part or blank. During down-stroke of the press, the tray emerges with the part, at which time the part slides off the tray and drops in a bin or on a conveyor.

Two models are available: (1) Rack-driven in which the full tray cycle is actuated by a rack mounted to the press ram; (2) Cable-driven in which the tray in-stroke is energized by a steel cable attached to the press ram and the out-stroke powered by an air cylinder. Tray



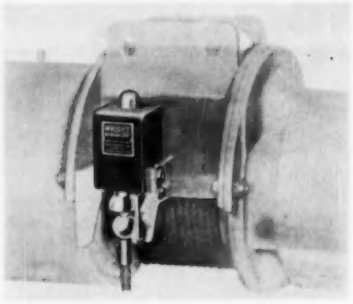
drive mechanisms are interchangeable. Change gears are available to vary the tray stroke from 10" to 20" on small models with up to 36" trays, and from 12" to 30" on large models having up to 72" trays.

For details, use **Key # MG-5** on inquiry card on page 1.

SHAFT COVERS

The problem of harmonizing protective covers with equipment designs where exposed shafts, hydraulic shafts and lubrication must be guarded against dirt and grit can now be overcome through the use of new "Elasticone Covers" available in attractive metallic finishes from Central Safety Equipment Co. These covers are spirally wound flat ribbon steel cones that snap into place . . . covering the exposed area while still allowing full motion in any direction. "Elasticones" are now available in chrome, copper or stainless steel finishes that can be used in equipment such as lift trucks, swivel chairs, electronic computers, hydraulic jacks, hydraulic shovels and others.

For details, use **Key # MG-6** on inquiry card on page 1.



HOIST OVERLOAD GUARD

Fast-acting mechanical overload protection for the operator, load and the hoist itself, is now available. Designed and built to fit any Wright Speedway Electric Hoist, the new Overload Cutoff unit, which is an integral part of the hoist frame, has been introduced by the Wright Hoist Division, American Chain & Cable Company, Inc., York, Pa. According to the manufacturer, the cut-off device is so simple in design and operation that it is guaranteed to give dependable, trouble-free protection for the life of the material handling aid.

Calibrated and sealed at the factory for the user's protection, the unit can take rugged abuse up to the critical point of overload; then it instantaneously "breaks" the raising circuit of the hoist. This allows the load to be safely lowered to the floor and unhooked. Once this is performed, the raising circuit is automatically restored. A functional part of the hoist at no sacrifice in headroom, the Overload Cutoff is available as standard equipment on all new Frame 2 and 3 Speedway Electric Hoists and as optional equipment on the manufacturer's Frame 1 and 1½ models.

For details, use **Key # MG-7** on inquiry card on page 1.

MAGNETIC TRANSFER SYSTEM

A new magnetic transfer system called the AAC Automatic Hand now makes it possible to automate transfer and removal of many parts previously handled manually. Intended primarily for use in handling large parts as well as those which cannot be handled mechanically without damage, it is useful in conjunction with presses, roll forming machines, press brakes, hydraulic presses, shears, welding equipment, etc.

The Automatic Hand can be adapted to a wide range of different transfer operations and makes it possible for plants of any size to automate the specific operations most needing it.

Each Automatic Hand installation is custom designed to solve some specific transfer problem by engineers of the American Actuator Corp. But the use of electromagnets and electromagnetic rollers which may be used either free standing, mounted on the machine,

or in various types of frames is basic to the system. These magnets pick up the piece to be transferred and move it to the next station where a switch is tripped releasing the piece. The piece may then be picked up by another magnet for further transfer, fed into another fabricating unit, or stocked, as the operation requires. By using a floating metallic roll beneath the piece to be moved, even non-magnetic materials can be easily handled.

Once installed, maintenance of the equipment is not a problem. The electromagnetic rolls require no slip rings and therefore are unaffected by filings or dirt which might collect. By automating such operations as removing blanks from a press, transferring and feeding to another press, etc., use of these new units eliminates many safety hazards.

For details, use **Key # MG-8** on inquiry card on page 1.

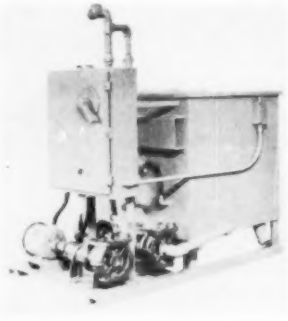
CRANE BOOM ELECTRICAL GUARD

A new safety device called Saf-T-Boom has been receiving praise from many contractors, insurance officials, operators, and safety engineers. It is designed to prevent 95 percent of the high-power-line crane contact accidents which have killed and injured hundreds annually during the past few years.

The patented device is a cage-like framework of steel supported above and to the sides of the boom by large heavy-duty insulators. The guard provides protection to the top, end and both sides of the boom. According to veteran crane operators, it does not hamper the effective operation of machines.

Saf-T-Boom has been field and laboratory tested at more than 50 thousand volts without leakage. The Saf-T-Boom Company reports the device is in use on military bases, governmental jobs as well as hundreds of private jobs.

For details, use **Key # MG-9** on inquiry card on page 1.



ELECTRONIC SOLUTION CONTROLLER

A new automatic Electronic Solution Controller system has been developed by the Electro Mechanisms Corp., for controlling concen-

tration of caustic, acidic or aqueous solutions. The controller can be used with either continuous or batch-type metal washing equipment, plating processes, chemical process systems, textile bath equipment, or any application where precise concentrate levels must be maintained. Providing complete safety against operating hazards, the complete system consists of: (1) a Concentrate-Level-Setting Control; (2) a Sensing Electrode which accurately measures **change** in concentration; (3) a Magnetic Amplifier utilizes output of Sensing Electrode to control operation of (4) a Pump Assembly which delivers concentrated solution to (5) a Wash Tank; (6) a combination Compound and Concentrate Holding Tank.

In operation, whenever the level of the concentrated solution in the Holding Tank falls below a preset point, the pump is automatically actuated and sprays a wash solution on the dry compound (or liquid concentrate) until the Wash Tank concentrate is again at the desired concentration level. The system is completely automatic since the Wash Tank solution is continuously circulated through the Sensing Electrode, and any variation in electrode output actuates the self-balancing control.

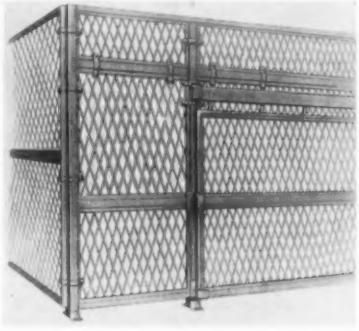
For details, use **Key # MG-10** on inquiry card on page 1.

CONVEYOR OVERLOAD GUARD

A conveyor overload-safety control is now being distributed exclusively by the Conveyor Division of The American MonoRail Company. The control is so responsive that one man can stop the conveyor by pulling on a trolley hanger, if such a sensitive adjustment is desired. The Tipp-Tronic Control is sold by American MonoRail as a component of its two conveyor systems, the "Chainless" and the "Cable-Way." The control can be used on any type of conveyor with electric motor drive, and is offered as an O. E. M. item to other conveyor manufacturers, as well as for installation on existing conveyors.

The control's ammeter visually measures the conveyor line pull by monitoring the current drawn by the drive motor or motors. The safety-shut-off point on the ammeter is determined by operating a properly lubricated conveyor under normal load, and setting the limit pointer slightly above the normal reading. If the line pull exceeds this limit, the conveyor motor is shut off instantly. The control is self-compensating for motor starting surges. Advantages of the safety control are: a) greater safety for personnel; b) protection against under-lubrication; c) prevention of damage to conveyor or drive due to "hang-up"; d) warning of broken or jammed trolleys; e) protection of drive motors.

For details, use **Key # MG-11** on inquiry card on page 1.



EXPANDED METAL PARTITIONING

The Products Division of The Globe Co. recently acquired the Hilmar Co., Inc., manufacturers of expanded metal partitions and panels for all enclosure problems. The new name for the product is Globe "Safe-Gard" expanded metal partitions which feature the exclusive "Quik-Erect" patented fittings.

It provides an easier method of guarding conveyors and machines and for all in-plant partitioning "Safe-Gard" is shipped ready for erection, with no cutting, drilling or welding required. These interchangeable expanded metal panels are said to provide greater safety, cut over-all costs, cover a wider range of use and require 85% less storage space. The section fitting clips save much of the erection time formerly required. These panels are of welded construction, give longer life, are more rigid and stronger than wire and will not ravel or fray.

For details, use **Key # MG-12** on inquiry card on page 1.

Company in Argentina buys moulds and machines for fabricating helmets, gloves, goggles for welders—and other Industrial Safety Equipment. Compañia Gonzales Hermanos, San Lorenzo 1728, Rosario, Argentina, S. A.

THE POSITIVE LADDER SAFETY DEVICE LOCKS-IN-A-NOTCH!

Prevents death and injuries from falling. If climber starts to fall, device locks in a deep notch on carrier rail and limits fall to approximately 6 inches —distance between notches.

LOCKS AUTOMATICALLY and INSTANTLY—HOLDS SECURELY

Will catch and hold workman if he starts to fall, even if unconscious. Cannot slip on down ladder. Requires no attention from climber; he climbs in normal manner. Inexpensive. Easy to install; 3 men can clamp it to ordinary ladder in few hours. Clamps to any rung ladder, peg ladder, pole or framework. No welding or cutting. Notched rail hot-dipped galvanized. Entire equipment rust and corrosion proof. Can be kept free of ice by applying heat inside the carrier rail. In use approx. 11 years. Approved by Safety Engineers and Government Agencies throughout country. Patented. Manufactured only by

SAFETY TOWER LADDER CO.
1024 Burbank Blvd., P.O. Box 1052
BURBANK, CALIFORNIA

(Use Key # M-15 on Inquiry Card on page 1)

The Millville, W. Va., quarry of Jones & Laughlin Steel Corporation's Blair Limestone Division has been awarded a Certificate of Achievement in the National Lime Association's 1958 Safety Competition. The Millville quarry, one of 14 concerns to win the award for accident-free performance during 1958, had a record of 136,409 man-hours worked without a disabling accident during 1958. Millville's accident-free record now extends from January 28, 1954, for a total of more than 720,000 man-hours worked safely by all employees.

Certificates of achievement in safety are granted by the National Lime Association to each competing lime plant that operated through 1958 without a disabling work injury. The award-winning plants operated 1,919,835 man-hours, or 24 percent of the total worktime among the 45 operations that competed. The J&L plant, which has received this honor for the fifth consecutive year, was the third largest plant to win the award.

• • •

Two Ford Motor Company plants which established world safety records during 1959 are the first to receive a new award, the President's Citation, from Henry Ford II, company president.

The awards were made at a Ford Day luncheon in conjunction with the meeting of the 47th National Safety Congress and Exposition. Benson Ford, vice president and chairman of the dealer policy board, made the presentations.

Frank Wright, manager of the Buffalo (N. Y.) stamping plant, and Walter Johnson, manager of the Canton (O.) forge plant accepted the awards.

Employees of the Buffalo plant set a world record for the stamped and formed sheet metal product industry by working nearly a year-and-a-half without a disabling injury. From October 16, 1957, to March 28, 1959, Buffalo employees worked 10,709,877 man-hours before the streak was ended.

A world safety record for the drop forging industry was established by employees of the Canton plant from March 11, 1958, to June 30, 1959. In that period, Canton employees worked more than 3,100,000 man-hours without a disabling injury.

Four other Ford facilities also have set world safety records in their categories since 1955. They are the Dearborn (Mich.) glass plant, Dearborn specialty foundry, Chicago Aircraft Engine Division and the general offices of Ford International Division.

• • •

For the first time, the National Safety Council has awarded its President's Medal for successful application of the expired air method of resuscitation. The recipient, Charles H. Elstrodt, a chemical engineer at Hooker Chemical Corporation, Niagara Falls, N. Y., last summer revived a fellow worker, Gerald J. Kanouff, by the mouth-to-nose method of artificial respiration. Previous awards have been made for life-saving applications or artificial respiration by the Holger-Nielsen and Schafer manual methods.

Mr. Kanouff, a chemical operator, suitably equipped with an air-supplied respirator, had been cleaning out residues inside a 9-foot high tank-type still in an inert atmosphere because of a remote possibility of a flash fire. Working under close observation by Mr. Elstrodt and the department supervisor, Richard C. Owens, Kanouff was wearing a wrist-type safety harness attached by D-ring and snap to a lifeline fastened to a mechanically operated overhead hoist, permitting his immediate removal in case of emergency.

While climbing a ladder to get out of the very warm still, Kanouff "passed out," but was prevented from falling back into the still by the tension of the lifeline. When Elstrodt and Owens hauled him out, he was rigidly unconscious and was not breathing. Because his mouth was clamped tight, mouth-to-mouth resuscitation could not be administered. By mouth-to-nose resuscitation instead, within two minutes Elstrodt had revived him sufficiently for removal to the plant hospital for oxygen tent treatment. Kanouff was able to be discharged within approximately three hours, returning to work the next morning.

• • •

Bethlehem Steel Company announced that its Bethlehem, Pa., plant has, for the twelfth time and second straight year, won first place among the Nation's largest steel plants in the National Safety Council's annual Metals Section Safety Contest. The company's Sparrows Point, Md., plant placed third.

This is the 17th consecutive year that a Bethlehem Steel operation has won top honors in the Steel Mills Division of the Metals Section. Twenty major steel plants competed in the 1958–1959 competition.

To place first in the Steel Mills Division the Bethlehem plant recorded a frequency rate of only 0.68 disabling injuries per million

man-hours worked. The Sparrows Point plant frequency rate was 0.79.

Bethlehem Steel operations other than the Bethlehem and Sparrows Point plants won the following awards in the safety contest:

Machine Shop with Foundries Division, Group B (among 31 operations)—the Staten Island yard's propeller shop, a first place with a perfect record.

Heavy Fabricating Division, Group B (among 38 operations)—the car department at Johnstown and the Leetsdale works tied for first place with perfect records. Steelton works finished third.

Heavy Fabricating Division, Group C (among 66 operations)—the Buffalo works and the Buffalo, Dunellen, N. J., and Jacksonville, Fla., plants of Buffalo Tank Corporation, a Bethlehem subsidiary, tied for first place with perfect records.

Light Fabricating Division, Group D (among 81 operations)—the Johnstown and South San Francisco works tied for first place with perfect records.

Light Fabricating Division, Group E (among 104 operations)—the Philadelphia reinforcing bar fabricating shop and wire rope mill depot, a first place with a perfect record.

Nine operations were awarded Certificates of Achievement in their respective divisions and groups: Steelton, Los Angeles, Seattle and Lebanon plants, Pottstown, Rankin, Chicago and Torrance works, and the Fairfield plant of Buffalo Tank Corporation. This award is made to an operation (excluding first, second and third place winners) having a frequency rate below the group average and with a reduction in rate of at least 15 percent in comparison with its rate for the previous three years.

• • •

The American Gas Association's Safety Achievement Awards were presented to 13 gas utility and pipeline companies during the first afternoon sessions of A.G.A.'s 41st annual convention at the Conrad Hilton Hotel. The awards, made annually to companies with the lowest accident frequency rates in the industry, were presented by J. Theodore Wolfe, president of A.G.A. and president of Baltimore Gas and Electric Co.

Honor awards were presented to:

Natural Gas Companies: Baltimore Gas and Electric Co., Baltimore, Md.; Central Illinois Light Co., Peoria, Ill.; Mystic Valley Gas Co., Malden, Mass.; Wisconsin Southern Gas Co., Inc., Lake Geneva, Wis.

Transmission Companies: Texas Eastern Transmission Corp., Shreveport, La.; Southern Natural Gas Co., Birmingham, Ala.; Michigan Gas Storage Co., Jackson, Mich.; Natural Gas Storage Co. of Illinois, Chicago, Ill.

Manufactured and Mixed Companies: Iroquois Gas Co., Buffalo, N. Y.; Citizens Gas and Coke Utility, Indianapolis, Ind.; The Hartford Gas Co., Hartford, Conn.; The Superior Water, Light & Power Co., Superior, Wis.

Liquefied Petroleum Gas Companies: Gas Co. of Vermont, Inc., Barre, Vt.

Auto Accidents Studied

(from page 42)

on drivers, especially when less than an intoxicating amount is in the blood? What is the exact relationship of the vehicle's rate of speed to the time needed for a driver to recognize dangerous situations and take evasive action? To what extent are accidents caused by specific vision deficiencies or other physical defects? What are the real reasons for inattention of various kinds in solving the problems presented by modern traffic situations?

This program is a pilot study, out of which will come valuable new data on accidents, as well as new concepts and techniques of collecting data. The pilot phase is expected to take three years of fulltime work by the team. Five or more additional years may be needed to get final answers.

The ultimate goal is to simplify and standardize scientific methods that can be used by investigators without scientific training. This will permit scientifically valid accident investigation on a national scale.

Field Research Team

Conducting the field research on this project is a team composed of Dr. Edward R. Jones, psychologist and sociologist; Dr. Mary F. Young, medical doctor; and Robert B. Mack, engineer. The team, later to be joined by a statistician, works under the supervision of J. Stannard Baker, director of research at the Institute.

The three scientists will gather information by direct investigation of actual accident cases, collecting physical and mechanical data making observations and talking to witnesses and the people involved. In the project office, the team will interview the drivers in a friendly but penetrating manner.

the *mira* Corporation

All Plastic,
with "Bite-Proof"
center septum.

Resuscitating Tubes

For use in Mouth-to-Mouth Artificial Respiration

Each Resuscitating Tube, patterned after those described in the literature, has a larger and smaller end. Thus, the two *mira* Resuscitating Tubes, Child's Size and Adult Size, together cover the range from small children to adult men, in four steps.

New Low Prices, in attractive durable box:

Set of Adult and Child's Size . . . $2.50
Single tube, either size $1.25

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2656 No. Pasadena Ave.
Los Angeles 31, Calif.

Manufacturers of the MIRA OXA-100 Oxygen Analyzer and the continuous-reading MIRA T-100 Surgical Thermometer.

(For details, use Key # M-16 on Inquiry Card on page 1)

inside the trade

Announcement has been made that sales of the products made by *A. SMITH & SON, INC.* of Philadelphia will now be handled by *Reeves Sales Co.* The new distributing agency, which will be headed by *Frank Delrose*, will carry the Reeves line of both stretchers and fire-resistant blankets and curtains. The address of the new company is: 4635 Magee St., Philadelphia 35, Pa.

President *C. H. Bell* of *GENERAL MILLS, INC.*, announced that the company has acquired the business and assets of *Magnaflux Corp.*, pioneer in the development of techniques and equipment for detecting hidden flaws in industrial materials. Magnaflux will continue in business at its present location in Chicago and under the same name, as a wholly-owned subsidiary of General Mills.

BOYER CAMPBELL COMPANY has announced the appointment of *William R. Orr., Jr.*, as Safety Sales Representative for Boyer-Campbell's western Michigan territory. He will be based in Grand Rapids where he has resided for the past 12 years. He formerly was in the building maintenance products business.

E. L. Babcock has been appointed sales manager of *GRO-CORD RUBBER CO.*, according to an announcement by Forest Moor, president. Babcock has been with Gro-Cord since 1946. He was formerly district sales manager in the mid-Atlantic territory; five years ago he transferred to the home office in Lima, O., and was named sales promotion manager. His appointment as sales manager for Gro-Cord came on September 1, 1959.

PROTECTION CONTROLS, INC., manufacturers of electrical safety equipment and controls, announces the completion of their new plant at 7317 N. Lawndale Avenue, Skokie, Illinois. Robert E. Yates, President, says this expansion represents a three-fold increase in plant area for offices, engineering and assembly facilities.

The firm also announced appointment of new sales representatives to handle regional sales of their new standard line of combustion safeguard controls: *Smith Combustion Equipment Co.*, Chicago, and *Instrument Service & Equipment Co.*, Cleveland.

STRONG, CARLISLE & HAMMOND has announced the opening of its new Cleveland office now located at 11770 Berea Road, Cleveland 11, Ohio, for distribution of the company's safety protective equipment. *Thomas L. Ritter* is general sales manager and *Louis J. Lackner* is manager of the safety division. The office formerly located at 1492 West Third Street has been discontinued.

Pangborn Canada, Limited, has been incorporated to market the complete line of blast cleaning and dust control equipment and metal abrasives produced by *PANGBORN CORP.*, Hagerstown, Maryland.

With offices at 38 Mattson Road, Toronto, Pangborn Canada is equipped to better serve the growing list of Canadian customers in the blast cleaning and dust control fields.

MONSANTO CHEMICAL CO. has indicated its increasing stake in petroleum chemicals and functional fluids by establishing a new executive position of product director for these compounds in its *Organic Chemicals Division.*

Reinhard S. Wobus of Belleville, Ill., former technical production manager of the division, has been appointed to the new post.

William R. MacCready has been appointed Sales Representative in the Columbus, Ohio, area for the *Industrial Products Div.* of *THE FULLER BRUSH COMPANY*, according to an announcement by Verne Joy, Sales Supervisor for Fuller Brush.

WILLIAMS JEWELRY & MFG. CO. has announced the appointment of *Dennis J. Williams* as secretary of the company. Mr. Williams, who was recently discharged from the U. S. Air Force where he served in the Security Intelligence Division, is the son of C. B. Williams and is the fourth generation of the family in the jewelry trade.

The appointment of *George O. Pfaff* as Director of Marketing at *WHEELABRATOR CORP.*, Mishawaka, Indiana, has been announced by J. F. Connaughton, President. In addition to his current function of supervising abrasive sales, he will be responsible for marketing Wheelabrator's general products and Techline Division equipment and supplies.

BAR-RAY PRODUCTS, INC., manufacturers of x-ray accessories and radiation protective equipment announces the appointment of *American Medical Sales, Inc.*, of 1116 N. Detroit St., Los Angeles, as warehouse distributor. This firm will be represented by *Marvin Stevens* in the States of Arizona, California, Idaho, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming and the El Paso area. Standard Bar-Ray items will be stocked for immediate shipment from Los Angeles.

Andrew Mendelsohn has been appointed Superintendent of Installation and Service of *KIDDE ULTRASONIC & DETECTION ALARMS, INC.*, Clifton, N. J. This was announced by Paul W. Eberhardt, vice president. In his new position he will be responsible for all the company's fire detection system installation and service.

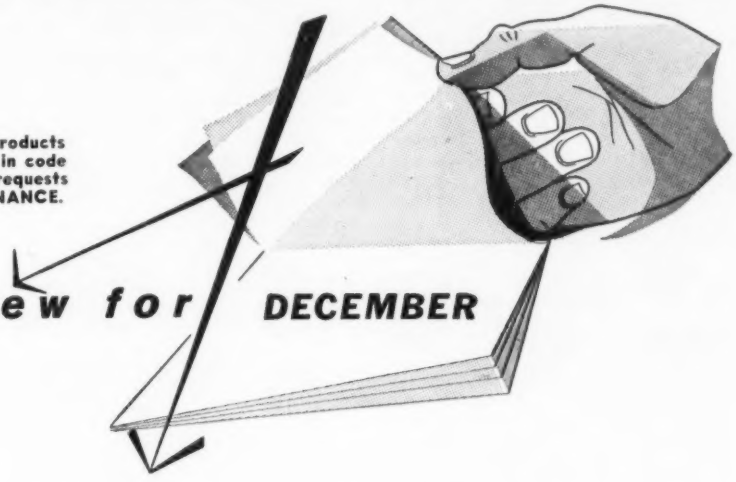
Mr. Mendelsohn joined Walter Kidde & Company, Inc. in 1940 and was transferred this year to Kidde's wholly-owned subsidiary, Kidde Ultrasonic & Detection Alarms, Inc.

Safety Appointments

The Dargon Cement Company, a Division of American-Marietta Co., has announced the appointment of *Ralph H. Smith* as safety engineer in the firm's plant at Northampton, Pa.

Material appearing in this section is published as information and is not intended to imply endorsement or guarantee by SAFETY MAINTENANCE.

To obtain descriptive literature of products listed, use Reader's Inquiry Card. Write in code number given each item. Send written requests to: Service Dept., SAFETY MAINTENANCE.



what's new for DECEMBER

SHATTERPROOF CONTAINER

(Use Key # 540 on Inquiry Card on page 1)

A REINFORCED, moulded rubber-fabric container, introduced by Fortex Industries, the Gar-Boy, Model BA25-40, can hold 10 gallons of most liquids, waste or other material. It is said to be resistant to lime, acids, salt water, grease, chemicals, etc., and capable of being thoroughly cleaned and odor-proofed. The container has no metal parts, and no seams or sharp edges.

The Gar-Boy is noiseless when dropped, won't dent, leak, break or mar surfaces, and is impervious to extreme heat or cold, the company reports. Equipped with a handle and a moulded, rubber cover which never sticks, the container can be used as a pail for refuse and garbage as well as for other normal or problem uses.

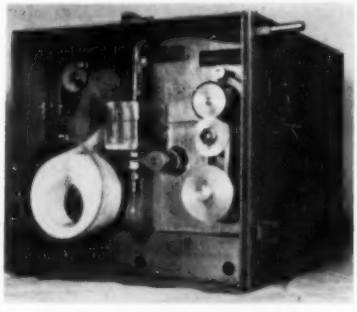
TAPE AIR-SAMPLE RECORDER

(Use Key # 541 on Inquiry Card on page 1)

A PORTABLE paper tape air sampler for recording dust or gas concentrations is available from Gelman Instrument Co. This inexpensive sampler will automatically collect up to nine hundred dust or gas samples by sucking air through a paper tape. The volume of air per sample is adjustable from 1.5 to 36 cubic feet. For dust measurements, the darkening of the ½ inch diameter sampling spot is measured with a densitometer. If radioactive dusts are involved, the tape can be passed under a Geiger counter. For gas measurements, there are available specially treated papers that change color in the presence of many gases, such as hydrogen sulfide, carbon monoxide, hydrogen cyanide, and phosgene.

This sampler, designed for field use, is compact and portable, weighing only 21 pounds. It includes a volumetric piston vacuum pump with graphite rings that require no lubrication. The linear air flow rate through the filter is suffiently high to assure good sensitivity and the special gas detection paper is readily capable of detecting and measuring low concentrations of harmful gases.

Applications include sampling radioactive fallout; industrial hygiene analysis of



the air in potentially hazardous locations; process control measurement of, for example, the hydrogen sulfide content of illuminating gas; and air pollution studies to obtain maps showing the distribution of a pollutant in an area and its variation with time, to assist in correlating the dispersal of pollutants with meteorological conditions.

INSECTICIDAL ALKYD PAINT

(Use Key # 542 on Inquiry Card on page 1)

ACCORDING TO Consolidated Paint & Varnish Corp., any room or building can be safely made insect proof with their product, an alkyd paint wall finish containing a potent insecticide.

Kil-Sect is applied in the same manner, and lasts as long, as any other fine paint. It is completely scrubbable for long, trouble-free maintenance and washing does not affect its power as an insecticide. The finish is available in a wide range of colors, to fit any need or decor, and has no offensive odor. When an insect touches the surface covered with Kil-Sect, containing DDD, it dies, either instantly or in a matter of minutes. The manufacturer also reports that the product is harmless to humans and animals.

FLASHING WARNING LIGHT

(Use Key # 543 on Inquiry Card on page 1)

A NEW EMERGENCY warning light, No. 211, designed by R. E. Dietz Co. for use on ambulances, police cars, fire trucks, government vehicles, etc., is capable of producing numerous light patterns and colors. Inside its plastic lens, which is available in amber, red, half amber and half red, blue or clear, are four sealed beam bulbs. These bulbs revolve continuously, driven by a motor and gear train assembly housed in the unit's chrome-plated brass base. By using different combinations of bulbs the frequency of the beam patterns can be set at 30, 60, 90, or 100 light impulses per minute.

The new light projects no higher above a car roof than do present models, yet it has greater lens area. The lens can be removed by merely loosening one brass bolt. Unit is factory assembled for use with either six or twelve volt bulbs.

AUTOMATIC LADDER LEVELER

(Use Key # 544 on Inquiry Card on page 1)

A FOOL-PROOF, automatic ladder leveler, manufactured by Barberton Aluminum Specialties, is reported to take the risk out of ladder climbing on stairways, inclines or slopes, roofs, and other uneven surfaces for maintenance men, painters, carpenters, electricians, firemen, tree surgeons, utility linemen, etc. The Putsy Foot levels and locks itself when the ladder is set in place, eliminating blocking and tying-off. Each leg automatically seeks its own level and is locked in position by the weight of the ladder.

Rust-proof extruded aluminum legs feature gear racks inside. The legs are connected by a telescoping rung, enclosing a drive shaft and gears which interlock the racks. The gears raise and lower each leg to the proper level and self-lock. The device is quickly attached to ladders of any length, up to 26 inches in width, and virtually any type, including spread or flared base ladders. Each leg has up to 27 inches of self-adjustment.

BACK-UP ALARM BELL

(Use Key # 545 on Inquiry Card on page 1)

A NEW gravity actuated mechanical back-up alarm which rings in reverse only is available from Warn Sales Co. Designed for easy installation on the rear wheel of trucks, the WARN-A-LARM sounds a loud, clear warning four times with every revolution of the wheel in reverse. When actuated, striker devices drop through a channel to strike the rim of the bell. Bronze springs at the end of the channels bounce the strikers back from the ball instantly for resonance. Brackets are adjusted to fit most hubs, and the alarm can be mounted on either wheel.

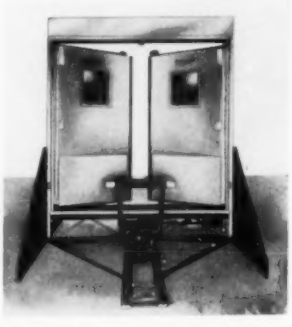
FACE SHIELD WITH HEAD AND CHIN PROTECTOR

(Use Key # 546 on Inquiry Card on page 1)

A SAFETY HELMET with a combination acetate face protector and soft vinyl hood and bib has been announced by Paulson Mfg. Corp. The new type of shield is said to offer top-of-head, full face and chin protection while working with flying particles such as sparks, grain, feed, seed, dust, powder and chips, as well as with chemicals and paints. The headgear is interchangeable and is made of lightweight plastic with aluminum spring pivots on each side to give even tension for added comfort, the headband is adjustable.

The face protector, of optical plastic,

is reported to be free of any distortion, and also fire and spark resistant. Plastic beading protects the wearer from any rough edges of the shield. The soft hood and bib are snapped into the top and bottom of the face protector by means of plastic bands. Unit weighs less than seven ounces.



INDUSTRIAL BUMPER DOOR

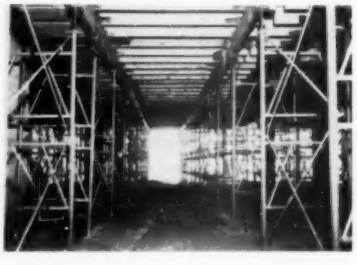
(Use Key # 547 on Inquiry Card on page 1)

A SHOCK ABSORBER door, designed by Clark Door Co., is reported by its manufacturer to be capable of withstanding hundreds of thousands of openings by heavily laden fork trucks without ripping, warping, separating from its fastenings or losing a tight, accurate closure. Urethane-filled bumpers absorb the shock, and flexibly suspended hinges let the door "ride" with the impact. Spring return is guaranteed. Available in several dimensions, the door is easily installed and requires little or no maintenance.

AUDIO-ANALYZER

(Use Key # 548 on Inquiry Card on page 1)

THE DEVELOPMENT of its first diagnostic audio-analyzer, a single channel, 6-tube audiometer with record playback unit and desk speaker which permit the operator to make 13 major pure tone and speech tests, was announced by the Zenith Radio Corp. The new unit, designed for use in hospitals, industry, schools, and hearing and speech centers, consists of a basic audiometer known as the ZA-200, capable of measuring frequencies from 125 to 8000 cycles per second, including half octaves from 750 cycles per second up. The instrument can be expanded by adding the ZA-400, an electrically matched Speech Record Playback Unit and the ZA-402, a Diagnostic Desk Speaker which permits speech testing by either recorded or monitored live voice. Matching cabinets in a modular design are made of Formica in plain and natural wood patterns, and their surfaces are burn proof, chemical proof and abrasion-resistant.



HEAVY DUTY SCAFFOLDING

(Use Key # 549 on Inquiry Card on page 1)

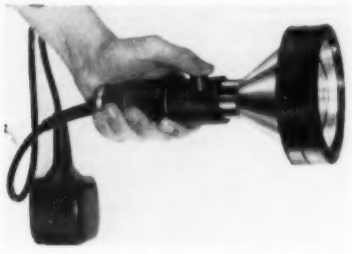
DOUBLE the load-bearing capacity of standard frame scaffolding is claimed for the new heavy duty, tubular steel frame shoring line introduced by Safway Steel Products, Inc. Each frame safely carries up to 20,000 lbs. The frames, the largest of which weighs only 69 lbs., come in heights to fit every job condition, and are connected horizontally with heavy, center-pivoted cross braces. Braces mount to frames with threaded studs and wing nuts or optional gravity latch. A new dual-use coupler and sleeve unit joins frames in height.

Any given load can be supported on half as many frames, reducing the capital investment required, and also time and labor for erection and striking. The versatile method also offers a series of new, time-saving equipment for shoring beams for bridges and overpasses, floor slabs for industrial buildings, etc. These include heavy duty screw jacks and base plates, ledger and joist saddles, and hollow steel shoring ledgers.

EXPLOSION RESISTANT HAND LIGHT

(Use Key # 550 on Inquiry Card on page 1)

AN EXPLOSION-RESISTANT safety lamp at moderate cost is available from the Burton Mfg. Co. The Jetlite features ultra-high-intensity illumination, supplied by a 65,000 candlepower aircraft landing light. This lamp provides relatively shadow-free spots of approximately 2500 foot-candles at three feet and about 1500 foot-candles at five feet—with a minimum lamp-life of 100 hours. The unit, including cord and transformer, is completely sealed in heavy, vulcanized neophreme rubber. This provides reliable performance in any



weather condition and safeguards against sparks and shorts when the lamp is used in highly volatile situations. The small, lightweight lamp has a 36-foot cord.

NON-ELECTRIC AUTOMATIC FIRE ALARM

(Use Key # 551 on Inquiry Card on page 1)

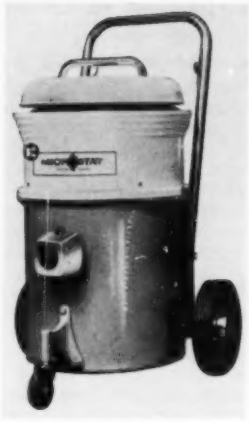
AN ECONOMICAL, heat sensitive, self-pressurized fire alarm with a visual glass eye monitor indicating liquid level, is being offered by Standard Fire Alarm & Signal, Inc. The alarm has UL approval for 1500 feet of tubing in a single, one-horn system, to give early warning in an unlimited number of areas. It is also approved for use with two horns in one system. Unit, which contains no moving parts, batteries or wires, sounds a blast of noise lasting from 15 to 20 minutes.

The alarms, which can be easily hung from ceilings, are available in fixed temperatures of 136° F and 174° F. At a given temperature, released pressure actuates the signal horn. Only the unit in the danger area operates, others are not affected. As many units as are required are interconnected with ¼" aluminum tubing. Horns may be located inside or outside the building, or both on the same system. Apparatus requires no dismounting for liquid level testing.

GERM FILTERING VACUUM

(Use Key # 552 on Inquiry Card on page 1)

AN INSTITUTIONAL vacuum machine called the Microstat is equipped with a special impaction filter that makes exhaust air bacteria-free. The filter is composed of thousands upon thousands of minute strands of fiberglass criss-crossed to trap bacteria and block their exit. Designed by the Kent Co. for hospital use, this cleaner can also be utilized in industrial plants and offices to help eliminate



the spread of germs from one employee to another. After extensive tests at Boston's Massachusetts Eye and Ear Infirmary, the machine was reported virtually 100 per cent effective in trapping bacteria attached to dust particles.

The Microstat has an airflow of 145 cubic feet per minute as compared to 37 to 50 cubic feet per minute delivered by the best household machines, the company reports. It has three wheels which make for easy maneuverability, is small, light and compact, and been engineered so that the change-over for wet pick-up is rapid and simple. Its diffused exhaust, at a 30° angle above horizontal, prevents the stirring up of germ-laden dust on walls, floors and ledges. The machine has two additional filters for collection of dust and dirt, comprising an area of more than 800 square inches, and a specially designed muffler.

PORTABLE FIRE PUMP

(Use Key # 553 on Inquiry Card on page 1)

A NEW, easily portable 50 lb. fire pump which can be carried by one man and features aluminum body construction with synthetic rubber bonded steel parts, is offered by Goodyear Pumps Inc. The pump is both self-priming and operable in any position without loss in prime. No check valves are required. The pump handles water with suspended abrasives at a suction lift of 28 feet while delivering 50 gpm at 100 psi discharge pressure.

Equipped with a 2-cycle gasoline engine mounted on an aluminum skid, the unit can be carried by one man over rough terrain. This feature makes it ideal for fire fighting in areas inaccessible to vehicles. A simple belt drive with guard eliminates the need for any coupling alignment. Four-cycle engine is optional. Available separately for forestry service, marine use and for incorporation on fire-fighting vehicles, the pump is also available as a complete off-the-shelf portable motor pump unit for farm, industrial, refinery, chemical plant and other applications where handling of viscous or abrasive liquids is required.

DISPOSABLE SHOE COVERINGS

(Use Key # 554 on Inquiry Card on page 1)

A DISPOSABLE polyethylene "boot" has been introduced by Plasticsmith, Inc. The new product, Footgard, is packaged in rolls of convenient size primarily for use by technicians in biological and atomic laboratories where control of the spread of contaminating elements is vital. Designed to be pulled on over the wearer's regular shoes and worn open at the top or closed with the addition of a rubber band or paper clip, they are watertight and normally can be worn for several hours before the polyethylene film wears through. They are easily slipped off and discarded after use.

CHUCK-HOLE FILLER

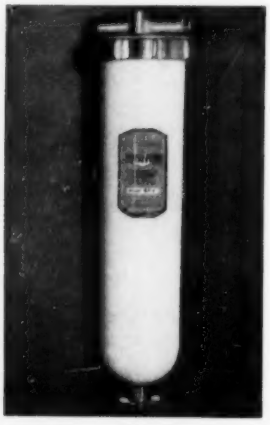
(Use Key # 555 on Inquiry Card on page 1)

A ROAD and driveway repair material that can be applied in almost any kind of weather has been developed by the Monroe Co. The product, Zor-X, repairs chuck-holes easily and quickly, requiring only to be tamped down. It can be used even in an area that is wet, or in temperatures as low as 15° above zero, and driven over immediately. This road, parking lot and driveway repair material can be used by street departments, commercial and industrial companies.

HOSE-HORN KIT

(Use Key # 556 on Inquiry Card on page 1)

A NEW HOSE and discharge horn assembly is being offered by Walter Kidde & Co. for its 10, 15 and 20 lb. carbon dioxide extinguishers now in the field. Replacement of older hose-horn assemblies with the new equipment will upgrade the fire extinguishing ability of the older portables equal to Underwriters' Laboratories ratings of 8 B:C, 10 B:C and 12 B:C, respectively—for the 15 and 20 pound models the highest ratings for each capacity. No special equipment is required. Simply unscrew the old hose and screw in the new. A new horn handle clip is included. Existing wall brackets can be re-used after insertion of the new hose-horn.



WATER STERILIZING FILTER

(Use Key # 557 on Inquiry Card on page 1)

A FILTER that will remove all waterborne bacteria has been developed by Filtros Inc. The Steripore Drinking Water Filter insures clean, safe water at all times. Filter is of the in-line type. Water enters one side of top casting, passes through the filter element and goes out other side of top casting.

The brass and plastic unit is designed for use on a separate cold water line to filter water that is to be used for drinking, cooking, or other uses where absolute purity is required. Capacity 3 qts. per minute at 40 lbs. pressure. Filter may be mounted at any convenient location. Special impregnation of filter unit releases a measured amount of silver ions to maintain constant sterilization by destroying any bacteria that may develop.

FIRE PREVENTING EMULSION FOR OIL SPILLS

(Use Key # 558 on Inquiry Card on page 1)

DANGEROUS fire hazards created by gasoline and oil spills can be controlled with the use of a new chemical hydrate emulsion formula, Slix, developed by the Research Group of the Penetone Co. Tests by New York and Boston Fire Depts. demonstrate its effectiveness in combatting such hazards on highways, streets, airport ramps, boat basins, lakes and water fronts. Used as an anti-coalescing agent, it shatters the oil film into globules, chemically coats each droplet and then isolates it with an area of non-combustible water of hydration. This Slix-oil emulsion is easily washed away with a stream of water.

When flushed into drains and sewer systems, emulsion prevents oil and gasoline from depositing on the walls of the conduits and removes the accumulated old oil buildup. On water the turbulent flow will remove the dispersed oils.

In fire fighting, its addition to water fog reduces the water particle size, a vital factor where water fog is used as the extinguishing agent. When applied as a coarse spray and agitated, Slix controls the vaporization rate of ignitable fumes and prevents explosive fires. It contains no solvents, and is odorless and non-toxic in addition to being non-flammable.

LARGE FLOOR MACHINE

(Use Key # 559 on Inquiry Card on page 1)

A NEW floor machine powered and engineered to clean large floors faster, more economically and efficiently is announced by Cassidy Products, Inc. A ½ H.P., 115–230 volt a.c. motor provides sufficient power to rotate the 23" brush over the toughest surfaces to steel wool sticky floor preserver applications quickly.

Three idler gears on transmission improve machine performance. Helical cut alloy steel transmission and permanently lubricated ball bearing provide long, trouble free machine life. Other features of the new Clean-O-Matic 23" include: toe activated handle adjustment to raise or lower

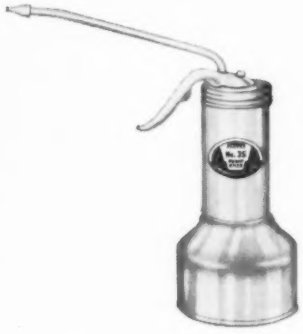
handle to operators height; large 5" semi-pneumatic tired wheels for easy portability over thresholds. A twin tube handle made of 12 gauge tubing provides extra weight for machine balance and reduces the tiring forces of torque for the operator.

ALUMINIZED CHEMICAL GLOVE

(Use Key # 560 on Inquiry Card on page 1)

LOW-COST, coated work glove, constructed for durability, has been introduced by the Surety Rubber Co. The Silvertex coating insures maximum resistance to most industrial chemicals and is also snag and abrasion resistant. Its reflective quality helps to keep the worker's hands cool and comfortable. The coating will not crack or peel and remains pliable for the life of the glove.

Available in eight different glove styles including knit wrist and band top with ventilated backs. All styles are of molded curved finger design and wing thumb construction for greater hand comfort and longer wear.



PUMP OILERS

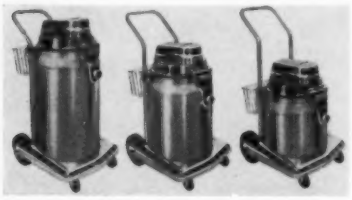
(Use Key # 561 on Inquiry Card on page 1)

A SERIES of four all-new Handi-Grip pump oilers, featuring rigid-angle or steel flexible spouts and leakproof bodies, and providing a comfortable grip, has been introduced by Eagle Manufacturing Co. Besides lubricating industrial machinery, the Handi-Grips can be utilized in service stations and home workshops for oiling automobile parts, lawn mowers, electric motors, bicycles, etc. A powerful positive-acting pump mechanism provides close control when oiling machinery and hard-to-reach places. The new oilers will deliver either a full stream or one drop, depending on pressure applied to the finger lever. The oilers have no leathers or soldered connections to wear out in the pump mechanism, and they will not upset on a workbench, because of a well-balanced broad-base design preventing tilting.

WET & DRY VACUUM CLEANERS

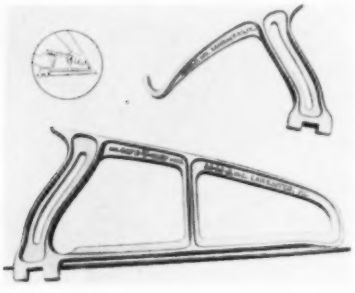
(Use Key # 562 on Inquiry Card on page 1)

NINE VACUUM CLEANERS, encompassed by three new series: the Imperial "5," powered by a ½ hp motor, the Imperial "10" with a one hp motor, and the Imperial "15" with a 1½ hp motor, have been introduced by Multi-Clean Products, Inc. Each series is available with 7, 12



and 17 gallon tanks, and is adapted for pickup of both wet and dry materials. A patented, washable filter, made from a special quick-drying synthetic fibre that won't rot or mildew, provides more than 1400 square inches of filter area. The Imperial "10" and "15" vacuum cleaners have special heavy-duty by-pass motors and independent cooling system so that dust-laden air from the tank is not drawn into the motor.

According to the manufacturer, motor speeds are substantially slower than needed by most comparable vacuum cleaners in order to move the same volume of air and create the some suction, and result in less wear on bearings and other moving parts. Motor brushes are constantly held at right angles to the armature, which practically eliminates burned-out armatures and extends the life of Multi-Clean brushes to 1,000–1,500 working hours. All tanks have non-clogging drains and 1½-inch intakes convertible to 2" if desired. An automatic clamp makes it possible to lift the head from the tank and replace it in a matter of seconds.



FILE SAFETY HANDLES

(Use Key # 563 on Inquiry Card on page 1)

MADE OF LIGHT, durable, cast aluminum in two sizes, Safe-T-Grip file handles, manufactured by M-M-A, Inc., fit any size or make of mechanic's files, and can be inserted or removed with a gentle tap. They enable use of the entire file surface, in either a one or two-hand operation, positioning the file to give more uniform working pressure and prevent uneven work. The handles are vented for working comfort.

VERSATILE AIR RESUSCITATOR

(Use Key # 564 on Inquiry Card on page 1)

NEW RESUSCITATION equipment comprised of a self-inflating bag, one-way valve and face mask utilizing atmospheric air, and a bellows-type foot pump, has been developed by Air-Shields, Inc. The breathing bag is lined with foam rubber which expands the bag and sucks in air through a one-way inlet. When bag is compressed, the valve automatically closes the exhalation opening, forcing air into the patient's lungs. Expired air escapes to the atmosphere when pressure on the bag is released.

The bag delivers volumes up to 700 cc with each squeeze. It is supplied for use with air only or with air and oxygen. The foot pump includes a plastic trap bottle.

A spare overflow valve in stopper is an added safety measure. The pump will continue to work even if the suction bottle overflows. Valves are large enough to let secretions and blood pass through.

IMPROVED ICE MELTER

(Use Key # 565 on Inquiry Card on page 1)

IMPROVEMENTS in its X-73 Ice Remover have been announced by the Monroe Co. A new pellet which gives the chemical greater concentration of strength and makes it act more quickly, results in melting action lasting longer and more economical ice control.

X-73 is reported capable of penetrating ice 32 times faster than rock salt. It starts acting immediately, and 100 lbs. will cover 5 to 8 thousand square feet, removing ice and snow from sidewalks, driveways or loading docks.

CORROSION RESISTANT GRATING

(Use Key # 566 on Inquiry Card on page 1)

A PAINT PROCESS that increases steel grating resistance to wear, abrasion, corrosion, chemicals, and weathering has been developed by the Blaw-Knox Co. This new Ponbake process provides a rugged, durable finish that can be applied to any of the firm's special or standard grating products if specified. In the new finishing procedure, grating is cleaned and phosphatized in one operation. Then, an epon base, high polymer synthetic paint is applied through a "flow-kote" method which assures complete coverage to 1-mil minimum thickness. Finally, the grating is baked at 350 degrees Fahrenheit to cement the bond between paint and metal. The company reports that comprehensive tests have proved the durability of the grating's finish—a mixture of xylel, epon resin, and color pigment: The epon base grating paint performed well in weather-ometer tests equivalent to 3½ years of exposure in a salt-laden atmosphere area like Fort Lauderdale, Fla. In a check for abrasion resistance, the steel grating was bombarded with No. 6 heavy gravel for 40 minutes, and no bare metal showed through the special paint covering. The grating, coated with the Ponbake process, has withstood concentrated sulfuric acid and sodium hydroxide (caustic soda) for several hours, and 5 per cent sulfuric acid and sodium hydroxide solutions for 72 hours.

CONDUCTIVE SHOE TESTER

(Use Key # 567 on Inquiry Card on page 1)

A SHOE TESTER that instantly signals the static-charge conductivity of footwear has been introduced by the National Cylinder Gas Division of Chemetron Corp. Placed outside operating rooms and plugged into an ordinary AC light circuit, the compact, lightweight unit provides hospital personnel with a sure means of testing shoe conductivity, the company reports.

A person steps onto the instrument's two metal plates located close to the floor. If the shoes are satisfactory, a light on the unit shines. But if the combined resistance of both shoes and body is more than 1,000,000 ohms the light remains off. In that case the shoes must be cleaned thoroughly and tested again. The device, called the Lite-Rite Shoe Tester, is equipped with test buttons to show that the unit is in working order and is properly calibrated.

zone mail indeed results in speed

The Post Office has divided 106 cities into postal delivery zones to speed mail delivery. Be sure to include zone number when writing to these cities; be sure to include *your* zone number in *your* return address — after the city, before the state.

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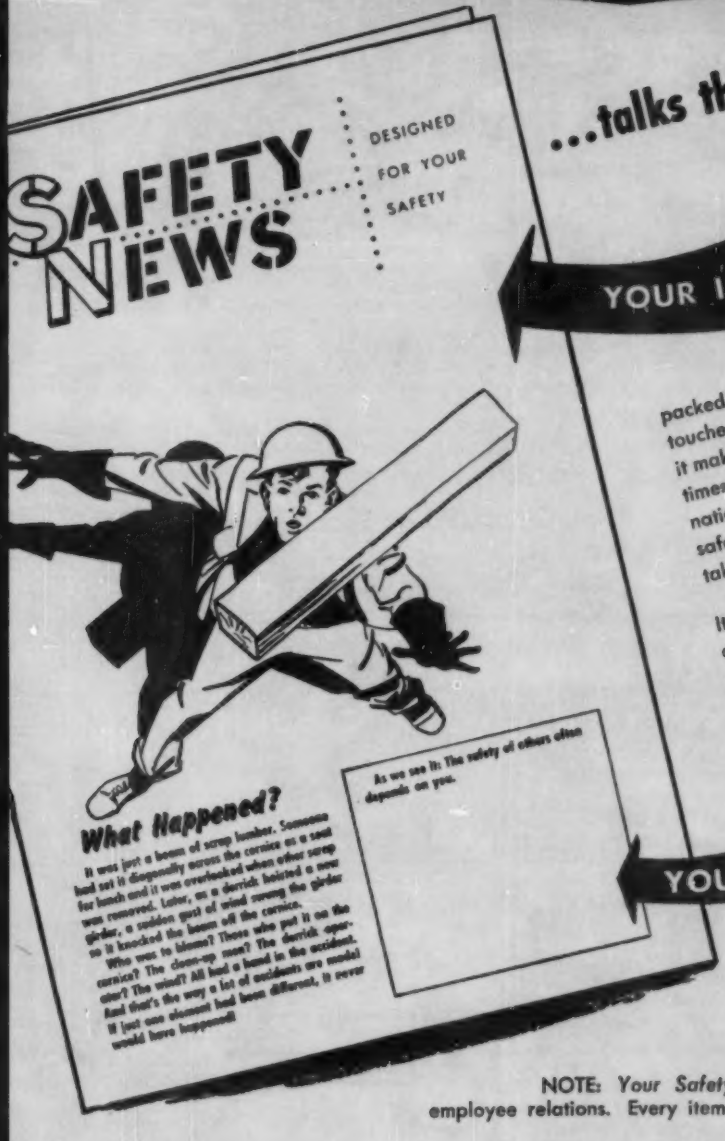
SEND

THIS PERSONAL SAFETY MESSAGE TO EVERY ONE OF YOUR EMPLOYEES.

- Safety is made appealling . . . vivid . . . engaging . . . colorful!
- Each worker clearly sees how safety benefits him . . . how doing his part helps others!
- You get enthusiastic safety cooperation instead of tolerance from every employee . . . every month!



. . . talks the worker's language!

YOUR IMPRINT HERE!

packed with pictures, alive with animated cartoons, touched with humour that gives snap to your message, it makes safety interesting and down to earth. Twelve times a year it covers accident hazards. Across the nation leading industrial firms state it's the only safety paper their employees will read . . . and take home to their families.

It gives the employer the advantages of personal contact . . . saves time and expense. One "lost time" accident prevented . . . more than pays for the yearly cost! Try it . . . it works!

YOUR SIGNATURE HERE!

Make *Your Safety News* your own publication . . . your good will ambassador . . . working for you toward better industrial relations. If you wish, your facsimile signature can be printed here to identify you with the message that gets next to your men and boosts morale.

NOTE: *Your Safety News* is designed to promote better employer-employee relations. Every item is carefully weighed and tailored to this viewpoint!

INSIDE PAGES
(Pages 2 and 3)

THOUGHTLESSNESS IS A THIEF
He'll steal his way into what you're doing, distract your attention and walk off with a finger, arm, eye or foot. Thoughtlessness takes many forms: it may be daydreaming, or worry about some personal problem, or just plain inattention. Anything that distracts you, especially around machinery, is a thief of your personal safety.
PLAYFULNESS IS A PIRATE
He is a deceptive rascal. His hi-jinks may put him in the spotlight, but his practical jokes and shearing-off often result in serious bodily injury and even death. And note this: he, himself, has lost a leg! As so often happens, horseplay can boomerang and the practical joker gets hurt too!
AN INTIMATE LOOK AT FOUR VILLAINS
SAFETY LAZINESS IS A SIMON LEGREE
If you are lazy about safety rules, then accidents will have the whip hand. We are safety-lazy when we don't bother to use mechanical guards, to take time to get the right tools for the job, to wear protective equipment such as goggles, hard hats, safety shoes, respirators, gloves, etc. Yes, Simon Legree has a whole pack of accident hounds to trail you.
HAZARDOUS METHODS ARE A HOLD-UP MAN
This villain, unsafe work habits, likes to lie in ambush for the unwary. But how do we fall into bad working habits? It may be by trying to cut corners, by wanting to keep to the old way of doing things, or by over-confidence. It's hard for anyone to believe that an accident can happen to him. It's easier to make excuses to ourselves for ignoring safety rules, but alibis only lead us up a blind alley with an accident waiting in ambush.
What You Should Know About Carbon Monoxide
This is a picture of carbon monoxide gas!
That's right, you can't see it. It's colorless, non-irritating, tasteless, practically odorless, but also deadly.
Here are the symptoms of carbon monoxide poisoning: First, a tight feeling across the forehead, followed by headache, throbbing temples, weariness, weakness, dizziness, nausea, loss of muscular control, increased pulse and breathing; BUT if the concentration of the poison gas is high, there may be loss of consciousness without these warning signals.
Just a few breaths of air containing 1% carbon monoxide can be fatal . . . so can one part of carbon monoxide in a thousand parts of air when breathed for 90 minutes.
It is possible for carbon monoxide to leak inside of a car if there is a loose exhaust pipe or manifold connection, blown-out exhaust gasket, cracked exhaust manifold, or leaky muffler. Play it safe.
1. Be sure your muffler and exhaust are in good condition (they can leak long before they become noisy).
2. Always keep a car window open, even a little, for fresh air.
Two Excellent Reasons
For Wearing Safety Shoes

EMPHASIZES SELF INTEREST

Your employee's self interest in his own safety is always emphasized. Constant safety consciousness is promoted by covering household hazards, transit to and from the job and on the job caution against accidents.

CLEVERLY ILLUSTRATES THE POINT

Artwork is carefully chosen to lodge home each point persuasively. The cartoon style makes YOUR SAFETY NEWS as familiar and welcome as the picture packed Sunday supplement.

WINS READERS WITH A FOLKSY APPROACH

Keeping the contents folksy, adding the light note of humor, gets your message across with a nudge instead of a bludgeon. Your monthly chat gets enthusiasm instead of indifference.

RIVETS ATTENTION WITH VIVID COLOR

Generous use of color sparks the message, and adds impact to the contents of YOUR SAFETY NEWS. Each issue is as alive as any news-stand favorite.

HOW TO ORDER:

YOUR SAFETY NEWS may be ordered with either the standard imprint or with your Own Special Imprint. The standard imprint reads "PLEASE COOPERATE FOR THE SAFETY AND HEALTH OF ALL . . . signed . . . A SAFE WORKER."

You can personalize YOUR SAFETY NEWS with the name of your firm and the name or facsimile signature of a company representative as illustrated. Give full instructions for your Special Imprint on the order blank below:

Item (1) FIRM NAME: Please show the name of your firm exactly as it is to appear.

Item (2) INDIVIDUAL NAME OR SIGNATURE: (If Desired). On a sheet of white paper, please show, in black ink, the individual name or signature, if desired, which is to appear each month on the first page of YOUR SAFETY NEWS.

NOTE: Although a personal signature is effective, some firms substitute: SAFETY DEPARTMENT, YOUR SAFETY COMMITTEE, A SAFE WORKER, etc.

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ALFRED M. BEST COMPANY, Inc. • 75 Fulton Street, New York 38, N. Y.

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Until further advised please publish for us each month _____ copies of YOUR SAFETY NEWS at _____¢ each.

☐ Special Imprint ☐ Standard Imprint

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6,001 copies and over . .	2½¢ each	2¢ each	200 to 500 copies	5½¢ each	4½¢ each
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1,001 to 3,000 copies . .	3½¢ each	3¢ each	25 to 99 copies	**	5½¢ each
501 to 1,000 copies . .	4½¢ each	4¢ each			

** 5½ each plus $3.50 per month. For Special Imprint. F.O.B. New York, N. Y.

Designed to further simplify your Safety Glass inventory

NOW

Get

1 FRAME with

2 UNIVERSAL FEATURES...

New CESCO Polyfit Bridge

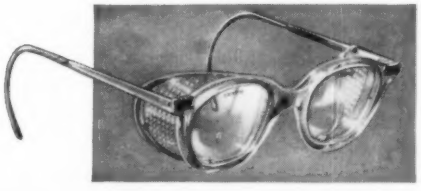
and New CESCO Interchangeable Temples

• Here's how to go all the way in simplifying inventory with a single safety glass that will fit the vast majority of your workers. New CESCO Polyfit frames have not one but two features to make them adaptable to the widest range of nose and facial contours. New Polyfit bridge design is amazingly comfortable on most individuals—thus eliminating the need to carry a large inventory of bridge sizes.

But in addition, CESCO Polyfit frames also feature gleaming nickel-silver temples which are interchangeable with other CESCO plastic frame glasses or with most safety glasses equipped with 5-barrel hinges—regardless of color. Sur-Loc pins fasten temples to frame. Tapered temples come in two styles—cable or spatula. Polyfit frames in flesh tone plastic are available with or without side shields.

- **Your choice of two sizes: No. 316 (46 x 39mm), No. 318 (48 x 41mm)**
- **Popular F7 shape lenses are removable for easy "on-the-spot" repair**

Ask your distributor to show you the New CESCO Polyfit safety glasses
He'll also be happy to introduce you to the complete line of CESCO head and eye protective equipment
There's a CESCO distributor located in most major cities



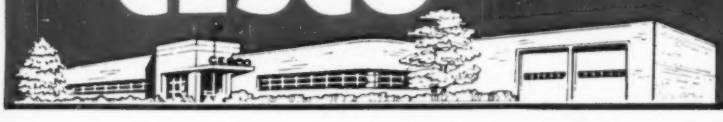
WITH SIDE SHIELDS

For total enclosure protection, CESCO Polyfit frames also come equipped with perforated plastic side shields. They offer the same outstanding features as the spectacles described above.

• Two Sizes: No. 316S (46 x 39mm), No. 318S (48 x 41mm)

CESCO

CESCO FOR SAFETY



CHICAGO EYE SHIELD COMPANY
2709 West Roscoe Street, Chicago 18, Illinois

(For details, use Key # M-17 on Inquiry Card on page 1)

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Thantis®

LOZENGES

first aid for throat irritations

THANTIS® Lozenges prevent lost man hours due to sore throats caused by coughs or colds.

THANTIS Lozenges do not produce unfavorable reactions in the mouth, because they contain no antibiotic.

THANTIS Lozenges act prophylactically to ward off infection.

THANTIS Lozenges have a twenty-nine year record of proven safety and effectiveness in clinical and lay use.

Mercurochrome®

First aid for wounds . . . . . .

MERCUROCHROME should be used promptly to prevent infection. No antiseptic has been proven to be more effective than MERCUROCHROME for topical application.

HYNSON, WESTCOTT & DUNNING, INC.

Baltimore 1, Maryland

(For details, use Key # M-18 on Inquiry Card on page 1)